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DISCO BAY, NORTH GREENLAND.

GREENLAND, in the technical language of the "Konglige Grönlandske Handel," or Board of Trade for Greenland, is divided for the purposes of government into North and South Greenland, each of these divisions being presided over by an Inspector, who has under him various local officials, all of whom are responsible, through the Inspector, to the Director of this Board of Commerce, resident in Copenhagen. The region we are describing being situated between the parallels of about 68° and 70° N. latitude may, however, be conveniently styled "Mid-Greenland." It will, however, be understood that the latitude of 66° is the political and commercial division of North and South Greenland.

Disco Bay and Island is probably the best known district in all West Greenland. The bay was once the chief whaling locality. At the southern end of it is the little settlement of Godhaven or Lievly, the residence of the Inspector of North Greenland, and the place where the whaling and exploring ships frequently touch. In all the Arctic books Lievly is a familiar landmark. To our seamen it is the type—an unfavourable one it is to be feared—of the settlements of the Danish Government trading monopoly of West Greenland, and in a few months there is every likelihood that the Arctic Expedition of 1875-77 will obtain its first acquaintance with the northern lands from the region in question. It may be, therefore, interesting to recapitulate, in the briefest possible manner, what we know of this typical Greenland district.

Geography.—The map affixed to this paper* will give the reader a better idea of the general contour of the coast-line than any laboured description. The southern boundary may be said to be the broken group of islands on one of which the settlement of Egedesminde ("The memory of Egede") is built—"like a spider in a web," as the Eskimo, with a power of metaphor unusual with these hyperboreans, describe its situation. The coast-line then trends easterly and northerly until the entrance of the Waigat Strait and the unbroken southern shores of Disco Island are its limits on the north. With this exception the line of coast is broken by inlets and bays, the great ice fjord of Jakobshavn—the chief birthplace of the icebergs of North Greenland, and which at one time is rumoured by tradition to have stretched across Greenland—being the most noted feature. A few detached islets lie near its entrance. Nowhere are the cliffs high, and on the southern shore they are in general flat and uninteresting. About Christianshaab and further to the north the shores are backed by fells reaching the height of about 1000 or 1200 feet, bare rounded knolls of gneiss, ice-shaven and worn, being their predominating character. Between these higher grounds run birch and willow-covered mossy valleys, bright with running streams and mimic waterfalls during the brief Arctic summer, and generally terminated by great moraines—the bones, if we may use the expression, of the glaciers which at one time filled them, but which have now sought other outlets. Everywhere there are indubitable signs that the extensive *mer de glace* which is believed to now cover the entire interior of Greenland, once extended over the whole, or, at least, most part, of what is now the uncovered or "fast-land" of the Danes. The ice is again beginning to encroach on the land, and everywhere in this vicinity there are proofs of a gradual subsidence of the ground. Islands, on which houses were built high and dry above high-water, are now getting so circumscribed that the natives have to desert them; and one case may be cited of a storehouse which was built on an islet off Claushavn, which had to be removed a few years ago, owing to its floor being now under water.*

If the traveller climbs any of the loftier eminences he finds the whole country dreary in the extreme. No tree or shrub higher than the creeping willow or birch is seen. The bare, ice-shaven, rounded rocks are clothed with a sombre coat of black, horny lichens, and strewed everywhere with the "travelled blocks" of the glacialists. The mossy valleys, and occasional flats, diversified with miniature lakes, formed by the melting of the winter snow, and even yet half-frozen, are about the only physical features to relieve the monotony of bare gneiss or trap. Later in the year the rocks will become gay with flowers; the ptarmigan in their summer plumage will fly up at your feet—the bell-like croak of the raven—almost the only living thing which the Greenlander hesitates about devouring—will make the weird solitude none the less solitary by association; an Arctic fox, with the characteristic impudence of its kind, will bark a "huc! huc!" off the rocks; the Eskimo women will be gathering

* For the use of which we are indebted to the Geological Society of Glasgow, in whose forthcoming volume of *Transactions* it will appear in illustration of a Memoir by the writer.

* See Robert Brown, "Physics of Arctic Ice" (*Quart. Jour. Geol. Soc.*, Feb. 1871), and "Das Innere der Grönland" *Petermann's Geog. Mitt.*, 1871).

"brændsel," or fuel of birch and turf, in the valleys; and the noisy sea-fowl from other lands—wayfarers like ourselves—will make merry the ordure-whitened rocks. But at present—say in early spring—all is cheerless and lifeless. Eastward lies the "inlands ice," the great glacier which, like a winding-sheet, envelopes hill and dale, mountain and valley, of the interior in its icy covering; while seaward the winter ice has scarcely yet melted, and is floating about in little floes, mingled with the great icebergs which are every now and again pouring out of the Jakobshavn Icefjord, or floating southward from the many "ice streams" which discharge themselves into Disco Bay and Omenak Fjord.

Geology.—The structure of the country around Disco Bay and the Waigat Strait, is a sort of epitome of the geology of West Greenland. On every side, except that formed by Disco Island, gneiss and other varieties of metamorphic rocks, with occasional spurs of syenite or granite, prevail, giving the scenery a tameness peculiarly characteristic of these rocks as seen in Greenland. On Disco Island we find the geology more varied. Trap alone appears on the Davis Strait side of the island, but on the southern and eastern coasts the trap bursts through strata of coal shale, and sandstone of miocene age, with the exception of a little patch of gneiss and syenite on which the settlement of Godhaven, at the south-western corner of the island, is built. These miocene strata with erupted (or contemporaneous) traps prevail over the rest of the island, and on both sides of the Noursoak Peninsula, as well as on the islands on Omenak Fjord and on Hare Island. Cretaceous strata also appear on the Omenak Fjord side of the Noursoak Peninsula, and probably also at certain places on the Waigat shores. The fossil remains found in these miocene beds consist of numerous land plants and a few insects, all showing that in comparatively recent times a luxuriant vegetation, somewhat similar in character to that of California, or the Southern States of North America, flourished in these Arctic wastes. Luxuriant evergreen oaks, magnolias, and redwood *(Sequoia)*, if all different from the Californian species, grew where the nearest approach to a tree at this day is the dwarf willow, creeping along the ground with a stem not over half an inch in diameter, and the whole of which would not cover a soup-plate. These remains have been carefully investigated by Professor Heer of Zurich, and his conclusions may be briefly summed up in his own graphic words, which, on the whole, fairly express the legitimate deductions derived from the study of the Greenland miocene flora. The cretaceous flora is much less rich:—He remarks that, "At the period when the sandstones which compose the smiling hills of Zurich were deposited, a considerable extent of *terra firma* must have existed in the extreme north. To this period the name of miocene has been given, or more generally that of the tertiary period. Our countries had then almost a tropical character. Among the forests of laurels and the tufts of palm-trees lived numerous animals belonging to types which now-a-days occur only in the warm and even torrid zones. Towards the north, indeed, the ground was clothed in a different vesture. Nevertheless Greenland, even at 70° N. latitude, presents a flora which, by its climatic characters, may be compared with that of Northern Italy. This flora teaches us that in the neighbourhood of the islands of Disco and Atanakerdluk there was once a lake of fresh water, upon the marshy edges of which great beds of peat were formed. These subsequently gave origin to the deposits of coal which appear along the coast. In our marshes it is not rare to see ferruginous water, which covers the soil with a reddish-brown crust. The same took place in the ancient marshes of Greenland: the iron deposited itself upon the plants which fell into the water, and these in their turn contributed to the precipitation and fixation of the iron. By this means has been gradually formed that ferruginous rock, in the bosom of which numerous plants are imprisoned. These fossils show that the marshes were covered with sedges and reeds; but the marsh cypress, the water-pines, the birch, the alder, and the poplar flourished there: for numerous fragments of these plants are covered by a ferruginous deposit. The water trefoil or buck-bean (*Menyanthes arctica*, Hr.) no doubt grew in the marshes in the same way that the existing species (*M. trifoliata*) adorns our moist meadows with its charming flowers: and the burr reed (*Sparganum stygium*, Hr.), the fruit of which has been obtained from the rocks, also formerly raised its bristling head above the waves. The rivulets also brought in leaves from other localities; they conveyed them from the primitive forests; and it is thus that we find their traces in the ferruginous rocks. If we enter into these forests, we shall see a marvellous profusion of trees and shrubs, among which we can distinguish forty-five different species. A tree with acicular leaves (*Sequoia Langsdorfii*, Brogn.) strikes us at once by its enormous proportions. It has left leafy branches in such numbers that there is scarcely a fragment of stone which does not contain its remains; and the remains which the hammer has extracted from the rock enable us to reconstruct the entire tree. It is accompanied by two allied species (*S. Couttsiæ*, Hr., and *S. longifolia*, Hr.), one of which (*S. Couttsiæ*) by the configuration of its branches and leaves, vividly reminds us of the *Sequoia gigantea* of California. A *Thuja* had a different aspect, as also the gingko (*Salisburea adiantoides*, Ung.), of which the leaves resemble the fronds of ferns, and differ so widely from those of other Coniferæ. The leafy trees are especially well represented; while our existing forests only present two species of oak, North Greenland possessed nine, four of which have been evergreen, like the Italian oak. Two beeches (*Fagus Deucalionis* Ung., and F. sp.——), a chestnut (*Cortanea Ungeri*, Hr.), two planes (*Platanus aceroides*, Göp., and *P. Guillelmæ*, Göp.), and a walnut (*Juglans acuminata*), from this forest, resemble the types of the same name known to everybody. Besides these, American species such as the magnolias, sassafrasses, and liquidambars were represented there; and the characters of the ebony tree (*Diospyros*) are to be distinguished in two of the species. The hazel, the sumach (*Rhus*), the buckthorn, and the holly, the guelder rose, and the white (*Cratægus*), probably formed the thickets at the borders of the woods; while the vine, the ivy, and the sarsaparilla climbed over the trees of the virgin forest, and adorned them with garlands. In the shadow of the wood grew a profusion of ferns, which covered the soil with their elegant fronds. The insects which gave animation to these solitudes are not all lost. The impressions of these which have reached us show that little *Chryso-*

melas and *Castilidæ* enjoyed themselves in the sun, and large *Tryositæ* pierced the bark of the trees, while charming *Cicadellæ* leaped about among the herbage. This picture is not a dream of the imagination. Plants and animals have all passed under my eyes." In all, about one hundred and sixty-seven of miocene plants have been discovered in Greenland, and of these thirty-two were discovered by us.*

The coal, like all tertiary lignites, is of a poor quality, but yet, when mixed with English coal, it forms a good fuel for household and even for steaming purposes. Admirals Inglefield and M'Clintock both used it in their vessels. It is mined to some small extent for the use of the Danish settlements around the bay.† Soap-stone (steatite) is found in some places in the primitive rocks, on the southern shores of Disco Bay. At one time it was extensively employed by the natives for making various domestic vessels, but is now much less used, owing to the introduction of vessels of iron, copper, and tin, amongst them. There is no other economic mineral, cryolite being only found in one locality—Arsut Fjord—in South Greenland.

Climate.—A locality situated in 70° N. latitude cannot be expected to be greatly favoured by climate. In the winter the cold is extreme, and the ground generally thickly covered with snow from September to May or early June. During this period the whole sea is covered with ice, and the Danes and Eskimos visit from settlement to settlement, in sledges drawn by dogs, which course over the frozen sea at the rate of 10 or 12 miles an hour. During the summer, under the four months of continual daylight, the snow soon melts over the lower lands, and the heat is often extreme. Mosquitoes are troublesome, and there being no shelter from the rays of the sun reflected from the snow, ice, and bare rocks, travelling is frequently very oppressive. The climate is, however, uncertain. In June I have experienced a snowstorm. Rain often falls. The day may be bright and sunny in the morning, and in the evening snow, sleet, and all the concomitants of spring or winter. The climate of Jakobshavn—latitude 69° 13′ 26″ N.—from the mean of many years' observations may be taken as a type of the Disco Bay meteorology:—

January ...	÷2·4 F.	July	+45·4 F.
February ...	0·3	August	42·4
March	8·2	September ...	34·6
April	+18·8	October	25·1
May	32·5	November ...	12·5
June	41·5	December ...	÷7·5

Winter (mean Temp.)	÷3·4 F.
Spring ,, ...	19·9
Summer ,, ...	+43·1
Autumn ,, ...	24·1
Whole Year ,, ...	22·5‡

During the short summer season vegetation springs up apace, and soon comes to maturity. The weather in September is uncertain, showers of snow falling, and the nights being very dark and cold. By October "bay ice" begins to form in quiet bays or inlets, and the ground gets its winter mantle of snow. The soil freezes hard to the depth of several feet—where it is so thick—and all nature slumbers. "About this time," to use the jest which Benjamin Franklin puts into the mouth of his "Poor Richard" under the head of January, "there may be expectation of much cold and snow in Greenland."

At Jakobshavn the prevailing winds during the summer are S.W., and during the winter E., which are also, taking the mean of the whole year, the prevailing directions. Up the inlets during the summer, generally in the afternoon, a cold icy wind blows from over the frozen interior of the country.

I may conclude these brief remarks on the meteorology by adding that all the winds blowing from the east are cold, owing to their coming across this inland ice, which, so far as we yet know, covers all the interior.*

Danish Settlements.—The trade of Danish Greenland—*i.e.*, the western shores from Cape Farewell to about 73° N. latitude—is a strict monopoly of the Danish Crown, and is administered by Government officials, solely for the benefit of the natives. The principle adopted is to buy the natives' blubber, skins, ivory, &c., from them at a low price, but also to sell them articles of European manufacture, which are necessary to their comfort, at an equally low figure: while coffee and other articles of luxury are sold at a good profit. Any surplus which remains over is credited to each district, and expended for the public good by the little local parliaments or *Partisoks* which are in every district, and the members *(Partisæts)* of which are elected by universal suffrage.

These Danish settlements are known as "colonies," and each is presided over by a "Colonibestyrer"—or, literally, "best man in the colony"—who is responsible to the Royal Inspector. These officials are not paid highly, but as the Danish colonial service is at the best but a poor one, there is no difficulty in filling the posts by responsible men. In every settlement there is also an assistant, who for some time serves on probation as a "volunteer"—a cooper, carpenter, and, if the settlement is large, a Lutheran priest and a schoolmaster—generally an educated native. These settlements are not lively places; indeed I know they are dull beyond imagination, nothing disturbing the even tenor of the inn-dweller's life save the little gossip how the carpenter's daughter is to be married to Peder, a mighty hunter of seal and white whale; how Hans Pangeitok has got a new kayak; speculations as to the probable arrival of the 'Marianne,' the annual ship from Kjöbenhavn, and the ball which is sure to take place in the storehouse immediately thereafter, or connoisseurish dissertations in regard to the quality of the last brew of beer which Johannes has concocted. This last is a very important matter. Yet, looking back on our life in these settlements I can honestly say, that it is with a feeling almost akin to affection that, in the more refulgent light of other days, I remember all the

* "Om de miocena växter, som den Svenska expeditionen, 1870, hemfört fran Grönland, af Oswald Heer." (Ofversigt af Kongl. Vet.—Akad. Förhand, 1873, No. 10) See also *Flora fossilis arctica; Philosophical Transactions*, 1869; *Les Dernières Découvertes dans l'extrême Nord (Bibliotheque Universelle et Revue Suisse*, t. xxxiv., pp. 512—543; *Les Régiones Polaires du Nord (Bibl. Univ*, Jan. 1867), &c.

† For a fuller description of the geology of Greenland the reader may be referred to my "Geological Notes on the Noursoak Peninsula and Disco Island, North Greenland" *(Trans. Geological Society of Glasgow*, 1873-4), and the works there cited.

‡ *Collectanea Meteorologica* Fasc. iv. (1856). Rink, *Grönland Geographisk og Statistisk beskrevet*. Andet Bind (1857) Tillæg Nr. 8.

* Disco Island is a miniature of the continent. It is an elevated plateau also covered by a *mer de glace*, which finds an outlet in miniature glaciers creeping to the coast.

kindness we used to receive—all the good-natured, fur-clad neighbours we had—the cracked bell that rang for "Danish Church" once a fortnight, in the crazy, wooden steeple—and all our little jokes, annoyances, and pleasures. We lived in a society of our own, which was not large certainly, and had the advantage or disadvantage that everybody—with their faults and virtues—were well known to each other. There was a good deal of tittle-tattle—some scandal of the type which is not frozen out of Greenland—much fiddling and dancing—many Sunday supper-parties, with the midnight sun streaming in at the windows—some drinking of arrack toddy, a brief flirtation or two, and even a little marrying and giving in marriage. In these settlements may be found many pleasant, and even accomplished ladies, the wives and daughters of the Danish officials. Pianos are not unknown, and literature is cultivated. You may even find the Tauchnitz edition of the best English authors in the "Governor's" house. The *Illustrated London News* is "taken in," and altogether the graces of civilized life are cultivated to such an extent that, as it is possible that this article may be read in Greenland, and criticised with the severity bred of an isolated life, I forbear, as I value my good name, to hint even further at the mysteries of Arctic "Society." At few of these settlements are there more than three or four Danes. At Christianshaab there is only the Colonibestyrer's family, a carpenter, and a cooper; at Claushavn, only a "volunteer," or assistant in charge; at Jakobshavn there is the governor and his family, two or three clergymen, a "seminary" built of turf, for the education of native catechists, a surgeon, and one or two workmen; at Ritenbenk, two; at Sakkak, there is only one; at Oujarsusuk, another; while at Godhaven there is the Royal Inspector of North Greenland, the Colonibestyrer, and one or two assistants. In addition, there are from 30 to 200 or 300 Eskimos at each of these ports. Ikamiut, Akunak, Oujarsusuk, Pakitsok, Sakkak, Dog Island, &c., are only outposts, presided over by an inferior official responsible to the Colonibestyrer of his district, and called an "Udligger," or "outliver." He is generally a carpenter or a cooper, who can, except on very extraordinary occasions, be treated with a reasonable quantity of rum, an accomplishment exceedingly rare among the minor Government officials in his Danish Majesty's Arctic possessions. Jakobshavn is the largest of these settlements, and has the pre-eminence of being possessed of a wooden church, built of drift logs, tarred all over. Egedesminde has also a church, but it is hardly an orthodox one. It has no steeple, and, accordingly, the Jakobshavners quite crow over the Egedesmendeans.*

Eskimo Settlements.—In addition to the Eskimos who gather round the Danish settlements there are numbers who live, especially in the summer, at little fishing stations, killing white whales, seals, hunting, &c. In the winter they generally crowd near the "colonies." Altogether there are about 9500 Eskimos under the Danish crown, and of these perhaps under 500 are scattered about Disco Bay and the Waigat. They are all civilized, most of them able to read and write, are nominally good Lutherans, but rather effeminate, and with a national distaste for soap and water. The Danish Government treat the natives with the most paternal care; no spirits are allowed to be sold to them, schools are provided, and altogether the rule of the little Northern Kingdom contrasts very favourably with the treatment we have given the aborigines in most of our colonies. Theft is practically unknown in Danish Greenland, the only case of late years being performed under the auspices of "Samuel," a young gentleman, who, while employed in the 'Fox' under Sir Leopold M'Clintock, acquired habits of life incompatible with his limited income, and accordingly, after the expenditure of his wages he resorted to habits which secured for him the unenviable notoriety of having three dozen administered to him in front of the flagstaff at Godhaven. Among Samuel's other accomplishments may be classed the English language—after the dialect of the fo'c's'le—finely flavoured with "the oath of British commerce." Though in civilization the Danish Greenlanders compare most favourably with the wild Smith Sounders, and the savages of the western shores of Davis Strait, yet it must be confessed that in skill and courage as hunters, the wild Eskimos have an immense advantage over their civilized brethren.*

Plants.—The vegetation around Disco Bay and Waigat Strait is, during the brief summer, rather luxuriant. The rocks are bright with mosses, and gaily-coloured flowers peep out from the crannies. In shady, moist localities several ferns may be found, and on the sunny flats there are quite Arctic wild gardens. The alpine rose (*Rhodendron lapponicum*), and the yellow poppy (*Papaver nudicaule*), one of the hardiest of alpine plants, climb to the top of the highest eminences, and the poppy will be found even after the Rhododendron has disappeared. The dwarf birch (*Betula nana*) and various dwarf willows are found in the valleys and elsewhere. In Upernavik district, and at the top of the south-east bay, the birch is said to grow high enough in localities to cover the reindeer. Such giant shrubs are looked upon with great pride by the natives. They take visitors to see them, and point to these extraordinary specimens of vegetation with an air as of "See this and—die!"

In a summer's botanizing, greatly broken in upon by other work, I found, in the vicinity of Disco Bay and the Waigat Strait, about 129 species of flowering plants and ferns, viz.: a *Thalictrum*, 3 species of *Ranunculus*, a poppy, 2 Cochlearias or scurvy grasses, an *Arabis*, a *Cardamine*, 7 Drabas, (two or three of which, though not described as new, were in all likelihood so), a *Silene*, 3 species of *Lychnis*, 2 species of *Cerastrum*, 5 Stellarias, 2 species of *Arenaria*, a *Montia*, an *Alchemilla*, a *Dryas*, 4 *Potentillas*, a *Sibaldia*, 8 *Saxifrages*, a *Hippuris*, 2 Epilobiums (one probably new), 2 Campanulas, a *Vaccinim*, 2 Pyrolas, a *Diapensia*, 2 Cassiopes, a *Phyllodoce*, a *Ledum*, a *Loiseleuria*, a *Rhododendron*, 2 Erigerons, an *Artemesia*, a *Gnaphalium*, an *Arnica*, a *Taraxicum*, 3 species of *Pedicularis*, a *Veronica*, a *Bartsia*, a *Pinguicula*, an *Armeriá*, 2 Plantagos, a *Polygonum*, an *Oxyria*, a *Betula*,

* On the map the positions of these places are marked chiefly from my own observations with the sextant.

* The English reader who may care to know more of Greenland life, and the Greenland Eskimo, may be referred to two articles—the paternity of which I may now blushingly acknowledge—in, respectively, the *Cornhill Magazine*, for June 1868 ("Friends in High Latitudes"), and in the *St. James's Magazine* for February 1870 ("In Hyperborea").

an *Empetrum*, 6 willows, a *Tofeldia*, 3 species of *Juncus*, 3 species of *Luzula*, a *Scirpus*, 3 species of *Eriophorum*, 7 species of *Carex*, an *Alopecurus*, a *Hierochloe*, a *Phippsia*, a *Calamigrostis*, a *Trisetum*, an *Elymus*, an *Agrostis*, 9 species of *Poa*, 2 species of *Glyceria*, a *Festuca*, 2 Club Mosses, 2 species of *Equisetum*, a *Cystopteris*, and 2 Woodsias. In addition there was a large number of lichens found (about twenty-two of which were entirely new to science), many mosses, fungi, *Hepaticæ*, and freshwater and marine Algæ—the latter, though not specially sought for, being almost equal in number to the whole of the Algæ previously known from the Arctic seas.* The most characteristic plant is the "Qvan," or *Angelica officinalis*, which is only found on Disco Island, in all North Greenland. It is, however, abundant in the vicinity of the South Greenland fjords, and particularly in the district of Julianehaab, so much so indeed, that the natives say that Disco was once a portion of Julianehaab district, and that a great angekok, or wizard, towed it north. He would have towed it still further had not a rival cut the rope! The plant is used in Greenland as an anti-scorbutic. On its leaves is occasionally found the pretty land-shell *Vitrinia angelicæ*. By the borders of the stream which flows through Lyngemarken—"the heath field," opposite the settlement of Godhaven—I also found the "ladies' mantle" *(Alchemilla)* in great abundance and of much luxuriance. This stream is warmer than the other waters in the valley, and hence the superior luxuriance of the vegetation in its vicinity.

The natives use, in addition to blubber, turf, birch, *Empetrum*, willow, *Andromeda (Cassiope) Ledum, Vaccinium*, &c., as fuel, and eat the berries of the *Vaccinium, Empetrum*, &c.

In South Greenland various plants are used hygienically; but with the exception of the *Angelicæ* and some Algæ, few are so used in the vicinity of Disco Bay. The Iceland moss is rarely, if ever, used by the natives.

Animals.—Hunting and fishing form the sole occupation of those natives who are not in the service of the Danish Government. The methods of hunting would take too long to describe, and would also be foreign to the nature of this sketch. I may, however, mention the animals which are chiefly hunted for food or for their ivory, blubber, or skins. The white bear *(Ursus maritimus)* is almost extinct in Mid-Greenland. During the whole summer we passed there we not only never saw, but never heard of one. In the northern district of Upernavik they are more common, and in South Greenland, where they arrive from the east coast with the "Spitzbergen ice-stream," they are frequently killed. Now and then one is killed in spring in the vicinity of Disco Island, having apparently wandered south, or having been drifted from the north or west on the ice.† The Arctic fox *(Vulpes Lagopus)* is common. The native dog *(Canis familiaris*, var. borealis) is getting gradually decimated by the peculiar disease which has made its appearance of late years in Greenland, but which, when I last heard from Greenland, had not spread south of the ice fjord at Jakobshavn. The cat has become domesticated, and follows the Danish ladies to the most northerly abode of civilized man. The lemming is entirely unknown on the west coast, except in the more northern parts of Smith Sound, where, I am informed by Commander Markham, Dr. Bessels, of Hall's American Expedition, obtained one or more specimens. It is also found in high latitudes on the east coast—pointing to a peculiar distribution of life, which I may, in another place, have to touch on. The musk ox is entirely unknown south of the glaciers of Melville Bay. The mouse and rat are regularly introduced every summer with the European ships, but rarely survive the winter. The Arctic hare (*Lepus glacialis*) is common. The reindeer (*Rangifer tarandus*, var. Grœnlandicus) is now so rare in the vicinity of Disco Bay that few natives care to go hunting it. On Disco Island, where it was so common in the days of Crantz and Fabricius, it is believed to be now extinct. During the summer of 1867, when we were there, only five were killed in the district of Ritenbenk. The yearly average had been about twenty or thirty, but the reindeer-hunting days are nearly over in that section. In the districts of Jakobshavn, Claushavn, and Christianshaab, I did not hear of one being killed. At Claushavn a few natives went out hunting, but met with bad weather, and returned, having shot nothing, and only seen two animals altogether. Great quantities are, however, still killed in the northern and southern districts of Greenland, but the number yearly killed, which, at one time, was from 10,000 to 20,000, is now on the decrease. The seals are, however, the main staple of the Eskimo hunt. Six species—*Callocephalus vitulinus, Phoca* (Pagomys), *fœtida, Phoca* (Pagophilus), *Grœnlandica, Phoca barbata* and *Cystophora cristata*—are the species found. Large numbers are killed both in summer and winter, but chiefly on the ice-fields during the latter season. The walrus is not a regular denizen of Disco Bay. The "right" whale (*Balæna mysticetus*) is now only a rare visitor. At one time it was killed in great numbers in this locality. Klokkerhuk was a special station kept up for the convenience of the "fishing," and at the other settlements this giant member of the Arctic fauna was killed in great numbers.*

In addition, the English and Dutch whalers killed great numbers in the bay. It was, indeed, their favourite locality up to the years 1820 or 1830. Four species of fin whale (*Physalus antiquorum*), *Bælœnoptera gigas, B. rostrata*, and *Megaptera longimana* are also now and then seen in the bay, though their favourite haunt is the cod-banks of Rifkol to the south. The spermaceti (*Catodon macrocephalus*) has not been recorded in the bay itself, but one was said to have been killed a few years ago near Proven, further north. The killer (*Orca gladiator*) pursues the right whale on its northward, westerly, and southerly migrations. The white whale (*Beluga Catodon*) and the narwhal (*Monodon monoceros*) are also often killed, especially in the winter, at the open places in the ice. The last two species named are, however, migratory, and

* See my *Florula Discoana:* Contributions to the Phyto-Geography of Greenland within the parallels of 68° and 70° N. latitude (assisted by Messrs. Oliver, Carrington, Lawson, Lauder Lindsay, Croll, Dickie, and Smith) in *Trans. Bot. Soc. Edin.*, vol. ix.: Lauder Lindsay in *Trans. Bot. Soc.*, vol. x., and in *Linnean Transactions* (description of Lichens discovered by me), 1870, &c.

† A wolf which had apparently crossed Davis Strait on the ice was, in the spring of 1869, killed near Godhaven. It is not a member of the Greenland fauna.

* See Reinhardt in Ray Society's *Memoirs on the Cetacea.*

desert the bay during the summer months. During the time we passed in that vicinity, in 1867, we never saw either, though both were exceedingly familiar to me in the much more extended voyage I made in the Spitzbergen Sea, Davis Strait, and Baffin's Bay in 1861. The other cetacea now and then seen in Disco Bay are *Delphinus euphrosyne*, *Lagenorhynchus albirostris*, *L. leucopleurus*, *Phocæna communis*, *Globiocephalius svineval*, *Hyperoodon butzkopf*, and *H. latifrons*, the latter being a doubtful species, and, indeed, it is a question whether the three species preceding it are visitors, except on very rare occasions, to Disco Bay, being usually found near the mouth of Davis Strait.

All the more common Arctic birds visit Disco Bay in the summer. Most of them, with the exception of the ptarmigan, and some of the raptorial birds, migrate during the winter, returning again when the snow melts off the lowlands, and the ice breaks up on the sea. There are no reptiles in Greenland, but the salt-water fishes are numerous—about seventy species having been already recorded. Most of these are also in the Disco Bay region. The shark (*Læmargus borealis*) fishing forms a considerable branch of industry. The cod and halibut banks are chiefly on Rifkol, but the small halibut (*Hippoglossus pinguis*, or "Kalleraglek") is caught in Disco Bay. Among the Danes, when sliced and dried, it forms a favourite dish.

The species of *Cottus* (*Grænlandicus* and *scorpioides*) or "kaniok" is the fish chiefly caught by the Disco Bay natives for food. The fishing of it is, nevertheless, considered among the natives as an occupation beneath the dignity of anyone but boys and old men, numbers of whom may be seen patiently angling for them from the edges of cliffs and rocks. About six species of *Salmo* are found in Greenland. Most of these are found in our district. Both trout and salmon are excellent, though with a thick layer of fat under the skin. The natives do not seem to care much for them. The invertebrata of Disco Bay are numerous, mollusca, echinodermata, crustacea, polyzoa, hydrozoa, &c., abounding, though to nothing like the extent the lower forms of animal life swarm on the Rifkol cod-banks. The sea will be sometimes thick with the most beautiful forms of acalephæ. A zoologist skilled with the pencil—for it is next to impossible to preserve these fragile animals in a condition fit to be identified and figured with any certainty—could reap a rich harvest in the Arctic Seas. In shallow water, off the shore, life is scarce, the continual grinding of the icebergs disturbing the bottom or destroying animal life. The shark's stomach is often an excellent repertory of the rare deep-sea forms which it is difficult for the dredge to reach. Insect life is poor; a few butterflies are seen during the summer months, some coleoptera, a few diptera, hymenoptera, &c., go to make up the limited insect fauna of Disco—Island and Bay.

ROBERT BROWN.

Dr. G. Schweinfurth has been appointed Director of the Khedive's Natural History Museum and Botanical Gardens at Cairo, and will leave Berlin in the course of the present month in order to enter upon the duties connected with this office, for which he is so eminently qualified.

THE VOYAGE OF THE 'CHALLENGER.'

VI.

THE section of the voyage of the 'Challenger' contained in the October number (1874) of the *Geographical Magazine*, being that comprised between quitting the Cape of Good Hope and her arrival at Melbourne, with the account of her visit to the southern isles of the Indian Ocean and the Antarctic Regions, towards the Termination Land of Captain Wilkes, was considered to have been brought to a natural termination; but as some very interesting remarks on the temperature of the sea water between latitude 65° 42′ S. and Australia have reached England from Captain Nares, it is believed to be advantageous not to delay its production, and, therefore, this chapter may be considered in the light of a sequel or addendum to the section.

* During the voyage from Kerguelen to Australia, five serial temperature observations were obtained between the Antarctic circle and the 54th degree of S. latitude, and four between that parallel and Cape Otway. As these observations are highly important, a full notice of each is appended, in order to afford every possible facility for discussion, and also to indicate what data are still required.

Owing to finding in southern latitudes a cold stratum of water situated between the surface stratum and one underlying it, both of which were of a higher temperature, it was only possible with the instruments on board to ascertain with certainty the temperature of the upper part of the lowest stratum, the indices of the thermometers having already registered a higher and lower temperature than that of the lower part. All the observations, however, agree in denoting that at a depth of from 80 to 200 fathoms there is a stratum of cold water lying intermediate between the superheated surface water and a warm underlying layer, which latter is evidently the continuation towards the cold regions of the main oceanic flow of water.

This cold stratum first makes its appearance in about latitude 52° S., where it is 32°·5 Fahrenheit. As the ice is approached it gradually decreases in temperature, until in latitude 66° it is found to be 29°, nearly the freezing-point of salt water. The warmer stratum of oceanic water underlying it also gradually decreases in temperature as higher latitudes are obtained, and from this it may be confidently reasoned that farther to the southward the temperature of the water from the surface to the bottom, will be found to be nearly uniform, at from probably 29° to 30°, but in that case it can scarcely account for the rise in temperature of the bottom water to 32°·5 in latitude 52° S., only about 1200 miles from its source, where we know that afterwards it retains that temperature without alteration for 3000 miles, until it reaches the Equator in the Atlantic Ocean.

During the winter season the ice at the surface must necessarily be colder than the water underlying it; it is, therefore, highly probable that the cold wedge of water found near the surface is merely the remains of the winter cooled sea, which has not sufficient time during the short summer to recover its temperature; it is also probable that during the winter, the solar

* From "Remarks on the Temperature of the Sea Water between latitude 65° 42′ S. and Australia, by Captain G. S. Nares, R.N."

heated surface-belt is entirely removed, and that the sea, as far north as at least the 63rd parallel, becomes frozen over, the frequent gales breaking up the field-ice, and converting it into pack. It is noticeable that the temperature of the underlying stratum was, on each occasion, found to be about one degree warmer than the surface-water; but these observations must, until further information is obtained, be considered somewhat hypothetical.

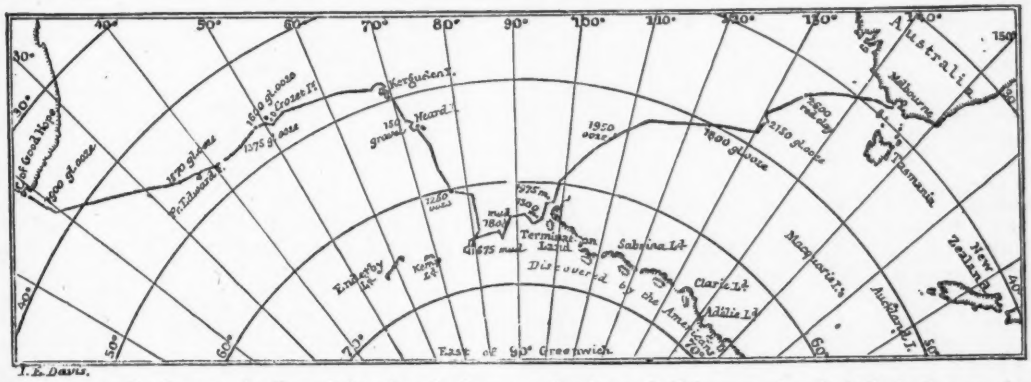
Taking the depth of flotation of an iceberg to be 200 fathoms, so long as it remains south of the 64th parallel of south latitude, it floats in water too cold to thaw it; therefore, with the exception of the few which have returned south from lower latitudes, and those broken by collision or some local weakness, they are all table-topped, with the line of flotation remaining the same as it was when they originally broke away from the glacier. Between the 64th and 60th parallels of latitude, both at the surface and below a depth of 100 fathoms, the water is sufficiently warm to melt those parts with which it comes into contact; at the surface a notch is melted out horizontally all round the berg, and, at the lower part, its side and the whole surface of the bottom is exposed to the decaying influences of warm water, the intermediate body, floating in a cold stratum, remains intact; the line of flotation is therefore continually changing, but seldom sufficiently so to immerse the original top of the iceberg.

Whether the immense number of icebergs, thawing as they float slowly along in those seas, help to produce or maintain the cold wedge is a delicate question; but the fact that it extends north just as far as the icebergs did in March would point to there being some connection between them.

The fresh water, thawed from the lower part of the iceberg at a temperature of 32° (such water being lighter than the salt water which was the means of thawing the berg), would rise towards the surface, but quickly becoming heavier as it mixes with the salt water, and also meeting with warmer and therefore lighter water, which itself has been plentifully fed with fresh water from the melting of the upper part of the berg, it remains in suspension, as it is colder than the warm underlying stratum it should intermix with it, but apparently does so very slowly. Taking the number of icebergs in sight on the 14th February as an average, and allowing the side of each to be a quarter of a mile in length, the amount of cold given out by them may be judged of by the fact that they occupied one-fifteenth of the surface water.

The coldest bottom temperature registered in the Antarctic Sea, north of latitude 54° was 32°·5. In latitude 54° it was 31°·1. In latitude 61° it was 30°·2, but these two last readings require corroboration. To the southward of 61° it certainly was not warmer than 32°. The coldest temperature registered in the Faroe channel, during the cruizes of H.M.S. 'Lightning' and 'Porcupine,' in 1868 and 1869, was 29°·5, which would agree well with that of the coldest water found in the Antarctic regions.

The section between latitude 53° 55′ S. and Cape Otway shows the gradual increase in the temperature of the surface water as we proceed north. The great thickness of the stratum between 45° and 50°, compared with the contraction of that between 40° and 45° is peculiar; the latter is about the same breadth as in the South Atlantic, but it has here been pressed down some 50 or 100 fathoms by the disturbed stratum above it. The disturbance in the latter can only be accounted for by supposing it to be caused in some way by the banking down of the water carried to the eastward by the westerly wind drift current on its meeting the coast of Tasmania, and the warm east Australian current running to the southward there; but this is merely conjectural.



On the 14th February 1874, in latitude 65° 42′, the most southerly station at which temperature observations were obtained, the surface water was 29°·5, the air 33°. The ship was about 1½ mile from the edge of the pack ice, with many icebergs around, forty-eight being counted within a horizon about four miles distant; the average height out of the water of the bergs was from 150 to 200 feet; most of them were table-topped, and had changed very little from the virgin state in which they broke away from the edge of the glacier, and must therefore have been swimming in water of a depth of from 200 to 300 fathoms.

Previous to immersion all the thermometers were cooled, in a mixture of ice and salt, to a temperature of 30°·2. The thermometers used at 50 and 100 fathoms each registered a slight change in the maximum index, which was probably due, either to an error in reading off, or to a slight defect in the instruments, as the maximum indices were frequently found to alter their positions slightly on entering cold water. The minimum index of each fell to 29°, proving that they had entered or passed through a cold stratum of water. The six thermometers used at the greater depths of 300, 500, and 1,675 fathoms, each registered a decidedly higher maximum tempera-

ture, showing distinctly that they had entered or passed through a warmer stratum of water than those used between the surface and a depth of 200 fathoms. The minimum indices all registered 29°, agreeing exactly with the six used at the lesser depths.

It is impossible that the thermometers could have been affected in their momentary passage through the air, which was at a temperature of 33° from the sounding-bridge to the water's edge, as the utmost care was taken to keep the outer case filled with the cooling mixture until the immersion of the instrument, and, on recovery, each thermometer was detached from the line and read off before the mercury had sufficient time to attain a higher temperature than that of the surface water, viz., 29°·5. The temperature of the bottom water could not have been warmer than 32°, or colder than 28°.

On the 19th of February, in latitude 64° 37′ S., the temperature of the surface water was 32°, that of the air 30°; a large number of icebergs were in sight. At a depth of 50 fathoms the maximum index, which before immersion registered 31°·4, rose to 32°, which was the temperature of the surface water; the minimum index fell to 29°·2, indicating a colder stratum of water. At 100 fathoms, the maximum index rose to the temperature of the surface water, the minimum fell to 29°, which was slightly colder than that at the depth of 50 fathoms; but as two other thermometers sent down to a greater depth, and which must, therefore, have passed through this cold stratum, did not register the 29°, the temperature of 29°·2 has been adopted as existing at 100 fathoms. The maximum index of the one thermometer sent down to 300 fathoms, rose from 33° to 33°·8, but as the two sent down to the bottom, and which must have passed through this stratum, only registered 33°, that reading has been adopted.

The bottom temperature, at 1800 fathoms, as registered by two thermometers, was between 32° and 28°.

On the 21st of February, in nearly the same latitude, and under the same circumstances of temperature of air and surface water, a few observations showed that with the surface at 32° the temperature of [illegible]3 was reached at a depth of 40 fathoms.

On the 26th of February, in latitude 62° 26′, temperature of the air 35°·5, that of the surface water

ISOTHERMAL TABLE BETWEEN THE CAPE OF GOOD HOPE AND AUSTRALIA, TO THE ANTARCTIC CIRCLE.

Depth.	14th February. Lat. 65° 42′ South.				19th February. Lat. 64° 37′ South.				26th February. Lat. 62° 26′ South.				11th February. Lat. 60° 52′ South.				3rd March. Lat. 53° 55′ South.			
No. of Fathoms.	Previous to Immersion.	Maximum.	Minimum.	Accepted Result corrected.	Previous to Immersion.	Maximum.	Minimum.	Accepted Result corrected.	Previous to Immersion.	Maximum.	Minimum.	Accepted Result corrected.	Previous to Immersion.	Maximum.	Minimum.	Accepted Result corrected.	Previous to Immersion.	Maximum.	Minimum.	Accepted Result corrected.
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Surface	...	...	...	29.5	...	...	.	32	...	...	...	33	...	...	34.5	34.5	40	40.5	...	37.2
10	...	...	...	...	..	...	...	...	...	...	...	...	35.5	35.5	34.	34.	...	...	36.8	36.8
20	...	...	...	...	...	...	...	...	...	...	...	...	35.8	35.8	33.5	33.5	42.	42.	36.8	36.8
25	...	...	...	...	...	..	...	...	...	..	...	...	40.	40.	31.2	31.2	...	...	..	...
30	...	...	...	...	...	..	...	...	...	...	...	...	35.5	35.5	30.	30.	40.8	40.5	36.6	36.6
40	...	...	...	...	...	...	...	...	...	...	...	...	35.5	35.5	30.2	30.2	41.	41.	36.6	36.6
50	30.2	30.	29.	29.	31.4	32.	29.2	29.2	...	...	...	...	35.5	35.5	30.5	32.2	41.	41.	36.6	36.6
	30.2	30.5	29.										35.5	35.6	32.					
60	...	...	...	...	...	...	...	...	...	...	...	...	36.5	36.5	32.2	32.2	40.5	40.5	36.6	36.6
70	...	...	...	...	...	...	...	...	...	...	...	...	36.	35.2	32.2	32.2	41.5	41.5	33.	33.
80	...	...	...	...	...	...	...	...	...	...	...	...	34.5	34.5	32.5	32.2	42.5	42.	32.5	32.5
90	...	...	...	...	...	...	...	...	...	...	...	..	35.	34.8	32.8	32.	42.	42.	32.5	...
									32.5	32.8	31.8		35.	34.	32.					
100	32.2	30.	29.	29.	31.6	31.8	29.	29.2	31.8	31.8	31.8	31.9	35.	34 8	32.	32.	40.5	40.5	32.7	32.5
	30.2	30.5	29.						32.	32.	32.		35.8	35 8	32.		43	43 2	32.8	
									32.5	32.8	31.8									
150	...	...	...	...	...	...	...	...	33.5	34.	32.	34.	35.5	36.	31.8	Rejected	...	...	...	...
									33.	34.	32.									
	30.2	30.5	29.						31.	34.	31.		34.	35.2	32.8					Uncertain
200	30.2	30.5	28.8	30.5	...	...	...	...	32.5	34.	31.8	34.	34.	35.	32.	35.5	42.5	43.	33.	
250	...	...	...	...	...	...	...	...	...	...	...	...	35.5	35.8	32.	...	...	...	...	...
													...	...	...					
300	30.2	32.	29.	31.8	33.	33.8	29.4	33.	...	..	...	...	34.	35.5	32.2	Uncertain	42.5	42.5	33.	Do.
	30.2	32.	29.																	
350	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...
400	...	...	..	32.5	...	...	...	...	...	...	...	...	...	...	...	...	42.8	43.	32.6	Do.
450	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	30.2	32.8	29.																	
500	30.2	32.8	28 8	32.	...	...	...	...	...	...	...	...	...	...	...	...	42.5	42.5	32.8	Do.
																Not				
Bottom	30.	33.	28.8	32. to	31.	32.9	29.3	32. to	...	34.	31.3	30.2	41.	41.	32.	colder	...	...	32.	31.
	30.	33.	28.8	28.	31.5	33.	29.	28.2				1975	41.	41.	33.	than 31.3			32.2	31.1
				1675				1800												

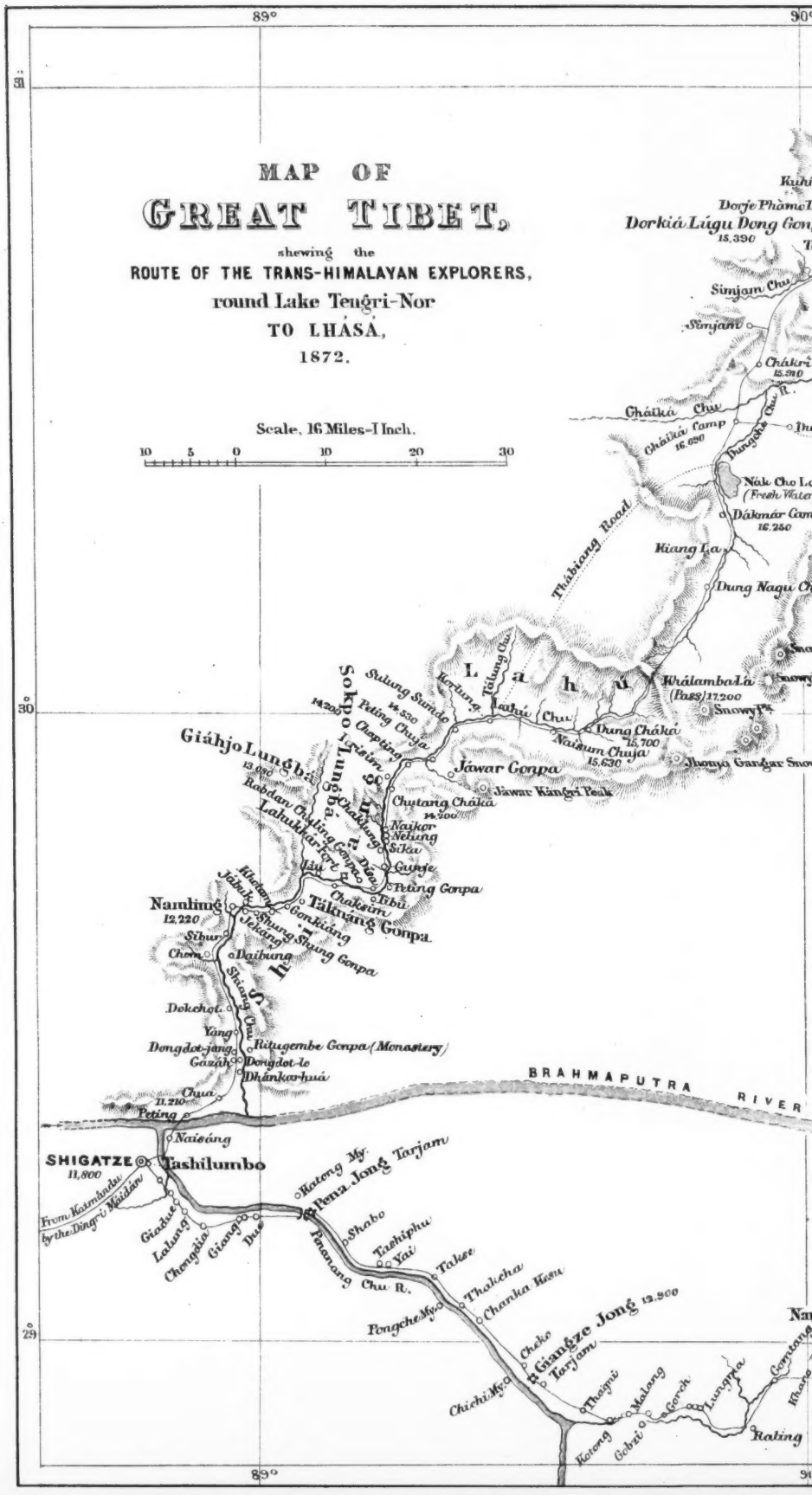
On the 26th of February, in latitude 62° 26′, temperature of the air 35°·5, that of the surface water

MAP OF
GREAT TIBET,

shewing the
ROUTE OF THE TRANS-HIMALAYAN EXPLORERS,
round Lake Tengri-Nor
TO LHÁSA,
1872.

Scale, 16 Miles=1 Inch.

10 5 0 10 20 30



T. Pettitt & Co. Litho, London

ranging from 32° to 33°; a great number of icebergs were in sight. Previous to immersion the thermometers were cooled in ice and salt to a low temperature. At 100 fathoms the indices of two thermometers did not alter, although they had been cooled to a temperature below that of the surface water, probably passing too quickly through the narrow belt of superheated surface water to take its temperature. A third, which before immersion was set at 32°·5, was afterwards sent down to the same depth, the maximum index indicated that it had passed through the surface stratum at 32°·8, and the minimum that it had entered the cold stratum of 31°·8; the mean minimum reading has, therefore, been adopted as the temperature for that depth.

At 150 fathoms, two thermometers registered a warm stratum of 34°, and the minimum index showed that it had passed through the cold intermediate stratum of 32°. This was also confirmed by the two thermometers sent down to 200 fathoms; and one sent down to the bottom, for each of them registered a maximum temperature of 34°, and a minimum of at least 31°·8. A second thermometer registered the maximum temperature at the bottom, at 1995 fathoms, at 31°·3 (half a degree colder than that registered by the first thermometer, and therefore probably the correct temperature of the water at that depth), this corrected for pressure becomes 30°·2; the bottom water was therefore not warmer than 32°·9, or colder than 30°·2.

On the 11th February, during our passage to the southward, when in latitude 60° 52′, an iceberg (the first one seen) was about 5 miles north of the ship, while the serial temperatures were being taken; temperature of the air 35°·5, sea surface 34°·2. Previous to immersion the thermometers, with the exception of those sent to the bottom, and one to 25 fathoms, were cooled to as low a temperature as possible. The coldest temperature registered was 32°·2 at 50 fathoms; at 150 fathoms the maximum index rose from 35°·5 to 36°; but as four thermometers, which must have passed through this warm stratum, if it existed, in descending to greater depths, did not register it, the reading has been rejected. At 200 fathoms there was a decided rise in the temperature, three thermometers registering from 35° to 35°·5; the thermometer lowered to 300 fathoms also showed that it had passed through this stratum, but it did not necessarily denote that the warm water continued to the depth to which the instrument itself descended.

As a further indication of the existence of the warm underlying stratum, it is noticeable that none of the fourteen thermometers sent down to 100 fathoms, indicated a rise in temperature, but that the five which went below that depth each registered a higher maximum than when they left the vessel. The bottom temperature could not have been colder than 31°·3. The thermometers used between 25 and 50 fathoms, which registered below 32°, were shaken in consequence of the line having accidentally got under the ship's bottom; the reading therefore was rejected.

This was the first time the underlying warm stratum was noticed, and it was then supposed to be doubtful. The remark in Captain Nares's journal, written at the time, is: "The rise in temperature at 200 and 300 fathoms may be due to the thermometers taking the temperature of the air after the register was set and before entering the water; but as every possible care was taken to prevent this, I am not yet certain that it is not a correct register of the temperature at that depth."

On the 3rd of March, in latitude 53° 55′ the temperature of the air was 37°·8, that of the sea surface 37°·2. No icebergs were in sight, but some were seen the day before, and one on the morning of the 4th was the last sighted. Serial temperature observations were taken from the surface to 500 fathoms. The water cooled to 32°·5, at a depth of 80 fathoms, but between that depth and 500 fathoms it was certainly no colder; and when comparing this observation with those taken previously in higher southern latitudes, a certainty was felt that below 100 fathoms there was a warmer stratum of water, extending probably to a considerable depth. The maximum indices of the thermometers having passed through the surface water at 37°·2, and the minimum through water at 32°·5, they were unable to register any temperatures between those degrees.

The bottom temperature at 1950 fathoms could not have been colder than 31°·1; and as each of the two thermometers sent down registered a colder temperature than that of any of the water they passed through near the surface, the reading may be taken as the correct temperature at that depth.

J. E. DAVIS.

GREAT TIBET.

DISCOVERY OF LAKE TENGRI-NOR.

THE progress of geographical discovery in Great Tibet is very slow. Only three Englishmen have ever crossed the frontier, and of these only one has given the results of his travels to the world. Mr. Bogle, who was sent on a mission to Tibet, in 1774, by Warren Hastings, wrote careful reports and took notes of all he saw and heard, but his manuscripts have been unused during the last century. They are now, however, about to be utilized. Captain Turner, employed on a second mission, followed in Bogle's footsteps about ten years afterwards, and his interesting narrative was published in the first year of the present century. Lastly, a Mr. Manning, formerly a mathematical tutor at Cambridge and the friend of Charles Lambe, succeeded in reaching Lhásá in 1812; but there is no record of his travels, and his journal, if he wrote one, has not yet been discovered.

The labours of the native explorers despatched, within the last ten years, by Major Montgomerie, have borne more fruit. In 1865 the Pundit made a journey from Nepal to Lhásá, and from Lhásá, through the upper valley of the Brahmaputra, to the source of that river near the Mánsarowar Lake. An abstract of his journeys, with a route map, was published in 1867. We have recently noticed the important journey of a second geographical explorer who went by Sikkim to Shigatze in Tibet, and returned through Nepal. His routes are shown on the map of the region between India and Tibet in the *Moral and Material Progress Report for* 1872-73. But by far the most valuable addition to our knowledge of Tibet has been made by a semi-Tibetan, a young man who had been thoroughly trained to the work by Major Montgomerie, and who was despatched, in 1872, to explore some portion of the unknown region north of the

Tibetan watershed of the Upper Brahmaputra. He has crossed the great range forming the northern boundary of the Brahmaputra Valley, has discovered and marched completly round the Tengri-nor or Namcho Lake (which has hitherto been placed on our maps merely on the authority of old Chinese surveys of unknown authorship), and he returned by way of Lhásá.

This is one of the most important geographical discoveries that has been made for many years, and the account of the young explorer's journey is extremely interesting. He set out with four assistants, and the party reached Shigatze on the 24th of November. They remained twelve days to purchase fifty sheep, the only animals likely to stand the journey over the stony mountain roads, and all the baggage was put on their backs. Leaving Shigatze on the 6th of December, the explorers crossed the Brahmaputra, and followed a regular route to the Tengri-nor, which is frequented by pilgrims, and by traders in salt and borax. The Brahmaputra, at the point where they crossed it on rafts, in the character of pilgrims, was 11,200 feet above the sea; and thence the route led them up the course of its tributary, the Shiang-chu, until they reached the Khalamba-La Pass at a height of 17,200 feet above the sea. This pass leads across the great range of snowy mountains which separates the valley of the Brahmaputra from that of the Tengri-nor, which forms a great inland system on a plateau 15,500 feet above the sea.

The streams were, for the most part, hard frozen, and the explorer was much struck by the number of hot springs that he met with, having temperatures varying from 130° to 180° Fahrenheit, the water generally having a sulphurous smell, and in many cases being ejected with great noise and violence, like the Geysers of Iceland.

The great lake, known to us as Tengri-nor, is called, on the spot, the Namcho or "Sky Lake," from its great altitude, and it proved to be a splendid sheet of water about 50 miles in length by from 16 to 25 in breadth. To the south it is bounded by a range of snowy peaks, flanked with large glaciers, and culminating in the magnificent peak "Jáng Ninjinthanglá," which is probably more than 25,000 feet above the sea. The range was traced for more than 150 miles, running in a north-easterly direction. To the north of the lake the mountains are not so high.

The Namcho Lake is considered sacred, and, although at such a very great distance from inhabited districts, and so high above the sea, there are several permanent Buddhist monasteries on its banks, and on islands, which are visited by large numbers of pilgrims.

The journey round the lake is of such great geographical importance that we give the whole narrative, as it has been drawn up, from the mouth of the explorer, by Major Montgomerie:—

"The lake is a magnificent sheet of water, and near Dorkiá it has the advantage of having an island close at hand which sets off the scenery. The island is about a mile long, and half a mile in breadth; it has a hill about 400 feet high in the centre, which is crowned by a temple of the goddess 'Dorje Phámo.' The explorer determined to make a complete survey of the lake, and he consequently deposited his property in the monastery with three of his men, being afraid of robbers; having done this he started off with three other of his men. On the 24th of January they reached Ringa Do on the margin of the lake; here there is another island, called 'Kuhi Ne Dobo,' close to the shore, which is about 1½ mile in length, by about 1 mile in breadth.

"On the 25th they reached Jádor Gonpa (monastery); here they saw three pyramids or cones of earth or sun-dried mud, each about 500 feet in circumference, rising to a considerable height. The explorer went under these mounds by an artificial passage, and found that one of them was open in the centre. The people say that they were originally all closed, and that when a certain very devout Láma, who used to worship under one of these mounds, died, he was taken up into heaven through the opening. The Jádor Gonpa has about 50 Lámas. Near the monastery there are a great many fossil stones which are held in veneration; they are called 'Naidhowa.' The explorer saw a gigantic doorway cut in the rock through which the Lámas say the god 'Ninjinthanglá' passes; its height is about 25 feet. Owing to heavy snow the explorer was detained two days at 'Jador.'

"On the 29th they reached Nángbá Do, which is also on the shore of the lake close to some small hills which are considered to be sacred. The next day they halted at 'Lángdang'; here they found the 'Shukpá' bush very abundant. On a low hill there is a temple of a god called Chogo Lá. On the 30th they got to Dakmar, and passing Thuígo Sumna shrine, they reached Nai Chu Sumna on the 31st. On their way they crossed the Nai Chu, which is a very large stream, being the largest that flows into the lake; it comes from the east. At the time the explorer crossed it was 40 paces in width, and completely frozen over.

"On the 1st of February the explorer reached the Tashí Doche Gonpa, a monastery, which is on a low hill near the lake; it has thirty-five Láma monks. To the south-west of this monastery there are a number of magnificent snowy peaks which are called the 'Ninjinthanglá' peaks. The Lámas say the highest peak is a god, and that he is surrounded by 360 smaller snowy peaks which act as his servants.

"To the east of 'Tashí Doche' there is another mass of high peaks called Nuchin Gásá, which appeared to the explorer to rise higher above the Namcho Lake than the Kailás peak does above the Mánsarowar Lake. The whole of these peaks were very imposing as seen from the monastery, which also commands a full view of the whole of the lake. Though the water of the lake is so salt as to be unfit for drinking it is nevertheless quite frozen over in November, the lake being about 15,500 feet above the sea. When the explorer saw it the surface looked as if it was made of glass; it is said to remain in that state till May when the ice breaks up with great noise. The lake contains fish, and quantities of small shells are found on the banks. The lake itself is a great resort for pilgrims.

"On the 3rd they halted near a small river; on the 4th they reached an open plain at night, and were put to great straits owing to a heavy fall of snow. They had left their tent behind at Dorkiá, and no shelter being available they had to clear off the snow and lie on the ground without any fire; they thought the cold would have killed them, but they managed to survive the night through. In the morning they found they

were well covered with fresh snow. On the 5th they went on to the Ghâiká Chu River; it was snowing all the time, and they were forced to camp out again without any fuel or covering, and passed another very miserable night. On the 6th they saw the sun again, and were able to get some fuel and to make themselves tolerably comfortable; but whilst crossing at the side of the lake near a small stream (the Simjam Chu), one of the men fell through the ice, which was covered with snow, and would have been drowned had he not got hold of another man, who pulled him out again. The man's clothes froze hard directly he got out, and he was only brought round by means of a fire, which they at once lighted.

"On the 7th February they reached the Dorkiá monastery, from which they originally started, having been fifteen days in making the circuit of the lake. They halted three days at the monastery, and started off on the 11th, getting that day as far as 'Ringa Do.' On the 13th, they reached the Jádor Gonpa before mentioned, and, on the 14th, Nángbá Do. Here the explorer heard there was a lake called Bul Cho, about 6 or 7 miles to the north; he accordingly climbed a peak in that direction, and saw the lake; he estimated it to be about 6 miles by 5. A kind of borax is found by and in the lake; it is called 'Bul,' and hence the name. This borax is used by the inhabitants of Lhásá and Shigatze as a spice for meat, for tea, and for washing clothes, bathing, &c. It is carried away by the traders in great quantities.

"On the 15th they reached Lángdang; on the 16th, Dakmar; on the 17th, the plain of Cháng Pháng Chujá, where there are several hot springs, in which the thermometer rose to 130°. On the 18th, as they were about to start, some sixty armed men arrived on horseback, and began plundering their property, and, in spite of their entreaties, took away everything except the instruments, which they said they did not care to keep in case the authorities should find them on them, and ask how they came into their possession. After a great deal of begging, the robbers gave them back a piece of cloth each, with two sheep and two bags of food, a cooking vessel, and a wooden cup to each man; with these they had to be contented, the robbers saying if they troubled them any more they would kill them.

"The explorer had intended to make his way from the Namcho Lake to the north as far as the city of 'Sinning,' but after the robbery there was no possibility of doing that; and indeed, they were so far from habitations that it was a question whether they could exist, and there was nothing for it but to march as quickly as they could to the south in the direction of Lhásá where they were likely to get into inhabited ground soonest. The day after the robbery they halted in order to consult as to the best course to follow. On the 20th of February they went as far as the banks of the 'Nai Chu' River; here one of the men got sick, and they were obliged to remain there all the 21st. Their food consisted of one pound of flour and hot water. They had, moreover, nothing to cover themselves with, the robbers having taken the tent, and were exposed to the snow and wind, which blew very hard.

"On the 22nd they reached Dam Niárgan Lá. The explorer says that he had got so weak that he took much shorter paces than he had hitherto done. On the 23rd they ascended the Dam Niárgan Lá Pass. After crossing, they decided to kill one of their two sheep, as they had exhausted all their flour; at the same time, seeing tents in the neighbourhood, all the men went out to beg, and after a long round came back with six pounds of flour, and began to feel more hopeful. On the 25th another man got ill, and they were obliged to halt again.

"From Dam Niárgan there is said to be a road to Lob Nor, and to 'Jilling' or 'Sinning.' From 'Dam Niárgan' it is about ten days' journey to Nákchukhá, a place that has a bad reputation as to the number of robbers who prey upon travellers; from thence it is about forty-five days' journey to Sokpohuil, which is quite a barren country, infested, however, by robbers. After passing Sokpohuil the inhabitants are more civilized, and are said to be very kind to travellers.

"The Lob Nor (? Kokonor) Lake is in the Sokpohuil territory, and close to it is the town of Kharká. It is about fifteen days' journey from Sokpohuil to 'Sinning' city, where a Chinese Amba, a man of considerable authority, resides. 'Sinning' is described as being very superior to 'Lhásá': good horses, sheep, &c., are procurable, and the shops are well supplied with silk, woollen articles, carpets, &c.

"On the 26th they halted under the Cháná Lá Pass. The country up to this point was called 'Dam Niárgan.' On the 27th they halted at Angchusa, where they noticed six Dogpá tents. On the 28th they reached 'Láchu Sumna,' the extremity of the 'Bádam' district, which begins at Cháná Lá.

"The 'Urirong' district extends from 'Láchu Sumna' to 'Dhog Lá.' On the 29th they reached Siwalungi Ritu (Gonpa) monastery, which has some 60 Láma monks. Here the height was observed by boiling-point; but owing to the loss of his quicksilver, when robbed at Cháng Pháng, the explorer was unable to take latitude observations. He, however, hoped that on reaching Lhásá he would be able to borrow sufficient money to enable him to refit and to return to this same place on his way north-east to China.

"On the 1st of March he crossed the Dhok Lá Pass encamping on the other side. The district of 'Jáng Tálung' extends from the Dhog Lá to the Chak Lá Pass. On the 2nd they reached the very large monastery called 'Jáng Tálung,' which has two head Lámas with about a thousand monks. Here they halted during the 3rd in order to rest and examine the monastery. Inside they found a large number of images carved in the walls, the whole of which were adorned with gold. The road from Lhásá to Lob Nor (?) and 'Jilling' ('Sinning') passes about 1 mile south of the monastery. The Sinning Kafilas pass by this route with their camels laden with merchandize. On the 4th of March he crossed the Chak Lá Pass and encamped at its foot on the opposite (south) side near the village of 'Lángmo,' where they saw the first signs of cultivation that they had met with since the 29th of December. On the 5th they reached 'Jhokár Churtan;' on the 6th Naimár village, which has about twenty houses, surrounded by a number of smaller clusters of huts. On the 7th they reached the monastery of 'Nehlin Dák;' on the 8th, after crossing the Phembu Gong Lá Pass, they halted at Lingbu Jong. The Phembu district ceases at the pass of that name. On the 9th of March the party reached Lhásá. They were excessively glad to get back to a civilized

place again, where they would at any rate have no chance of being starved, as they were at one time likely to be.

"Though the Lhásá people were hospitable enough, the explorer found there was no chance of his being able to borrow sufficient money to enable him to march to 'Sinning,' as he had intended. With the greatest difficulty he managed to borrow 150 rupees from a trader who was going to Gartok; but he insisted upon the explorer accompanying him, and, in addition, took his aneroid barometer and compass as a pledge for the money. The aneroid, which was a large one, he apparently took for a magnificent watch, and at the end of the journey the explorer's messenger, who was sent with money to redeem the instruments, had some difficulty in recovering them. Having the command of so little money, the explorer decided upon returning to India, and after a long and difficult journey, reached the head-quarters of the Great Trigonometrical Survey in safety."

His route survey extends over 320 miles of a hitherto entirely unknown country. Latitude observations were taken at intervals, and observations for the height above the sea, by boiling-point and aneroid, at twenty-four places. The geography of an area of 12,000 square miles has been elucidated, and one northern tributary of the Upper Brahmaputra has been thoroughly explored, thus indicating the position of the northern watershed of that great river. But the chief discovery has been the position, size, and elevation of the Tengri-nor Lake, and the character of the internal system of Tibetan drainage.

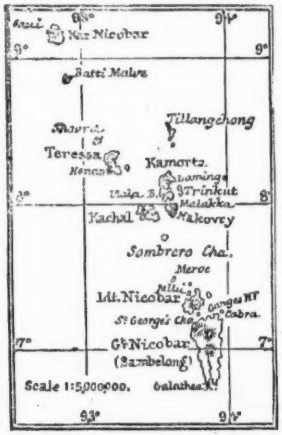
THE NICOBAR ISLANDS.

THE last addition to the great Indian empire may not be well known, and the following few lines on the subject may therefore be interesting to the general public. The Nicobar group consists of eight larger islands and some smaller ones. They lie in a line from S.S.E. to N.N.W. in the bay of Bengal, and form the link between the Andamans and the Malay Archipelago. The islands lie between 9° 15′ N. and 7° 45′ N., and from 93° E. (of Greenwich) to 93° 57′ E. It will thus be seen that the climate is tropical. The temperature is very uniform, and averages 28° centigrade. The rainfall is above 100 inches, and is at times, sometimes for months, very heavy, but it varies very much in the different years.

The islands are divided by their natural formation into two different groups which meet in the centre. Over the whole length of the islands volcanic action has left its trace as they are formed by later or newer upheavals. The washing down of the soil from the hills has formed swampy plains here and there. On this alluvium mangrove grows nearest the sea, and on the land raised over high-water mark you will find pandanus groves. More or less round the whole of the islands the sea has formed a corralline alluvium and the fringing reefs of coral stretch far out into the sea.

Great Nicobar, Little Nicobar, and Katchall are brown coral formation, and the other islands are of volcanic origin and are covered with a peculiar substance —polycistine clay—that must have formed deep down under the sea where the water was quite still. It is full of minute shells and contains proofs of its origin. When digging a well the present writer came on shark's teeth and whale bones in the clay 28½ feet under the surface of a hill.

The brown coral formation, as Rink calls it, and the other which I have just mentioned, meet near Nancowry Harbour, for Katchall belongs to the southern group, while the other three islands round the harbour are as different from it as possible. The islands, consisting of clay on volcanic rock, are covered with high grass, which is fringed towards the sea with jungle, whereas Katchall and the Southern Islands are all clothed with jungle down to the very edge of the sea.



On the coralline alluvium, before mentioned, grow the cocoa-nut trees, the great wealth of the islanders, and near these the natives have built their villages. The interior of each of the southern islands is still a *terra incognita*. It is not on record that a single European has penetrated into them. The jungle is high and difficult to get through, interwoven with rattans and thorny creepers, and, though magnificent to look at, it is very unhealthy. Into it no ray of light penetrates through the massive foliage of the giant trees, and without light no flowers thrive.

In 1869 the Indian Government took possession of these islands, and affiliated the new settlement to the great penal colony at Port Blair. A detachment of Madras sepoys, two hundred convicts, and building materials were sent to Nancowry Harbour. Now, in 1874, the settlement presents a very nice appearance. It lies on the northern side of the harbour, scattered on undulating grass-land. There are two wooden barracks for the convicts and a hospital; also a barrack for the sepoys, a corrugated godown for the commissariat stores, and houses for the officers and subordinates. The jungle has been cleared in the vicinity, and cotton plantations have been formed. The useless and unwholesome lalang grass has been ploughed up, and vegetable-gardens made, and roses planted. The swamps (fresh water alluvium) near the settlement have been cleared of mangrove, drained and bunded and planted with cocoa-nut trees. Cocoa-nuts are collected from the natives, and the young settlement supplies its sister colony with oil. One of the reasons why the present undertaking has been so much more successful than the former attempts, which I will refer

to presently, is that good houses and good food were supplied to the colonists. Being able to draw on Port Blair, where a similar undertaking is in a much more advanced stage, the colony has been kept supplied with all it needed. The cocoa-nuts used in the settlement are procured from the natives of the islands. These are not very numerous, and live as did the primeval lake-dwellers of Switzerland. They are big, strong people, with flat heads, and slightly protruding jaws. A full-grown man stands between 5 feet 6 inches and 5 feet 9 inches in height. They are quite distinct from the Malays and Burmese, and I believe that *they are related to the hill tribes in Formosa.* They have their villages on the coral sand inside the fringing coral reefs. The passages through the reefs are marked with some sign-posts. The houses are raised on posts, and are circular, covered with a dome-shaped roof. The tide rises under them and washes away the household refuse. Their huts are scrupulously clean, and are very well built. In one house you will generally find several families living, mostly relatives. The persons living in one hut form in a wider sense one household, and the work is divided among all. The floor of the house is planked, and along the side walls lie a few boxes and the beds, consisting of mats and little pieces of wood for head-pillows. On the walls are fastened their spears, oars, and row upon row of pigs' jawbones, symmetrically arranged, as well as spoons and other treasures. The entrance to a Nicobar house is through a hole in the floor immediately opposite the cooking-place. Here the old women of the house live, and the place is quite as neat as everything else about them. On the fire are several big pots, in which are boiled pandanus bread. This, together with fish, forms their staple food. The process of making the *larome* (pandanus bread) is very tedious and troublesome, and is undertaken by the women. A couple of feet under the floor of the hut are suspended cages for fowls and pigs, and these also belong to the women. The Nicobar women are very ugly, and wear their hair short cut; their clothing consists of a little blue skirt a couple of feet long. The men wear long hair, and their only dress is a strip of cloth tied round their waists and passed between their legs. This strip of cloth hangs down like a tail from behind. This was also the custom in 1647, for Keoping, a Swede, who anchored off the islands in that year, relates that he saw people there with cats' tails. Linnæus believed the tale. At a distance it looks not unlike a tail.

The Nicobarians are very superstitious, and fill their houses with all sorts of figures and carvings. Some of these are tablets representing the sun and the moon looking down upon the world, where the birds of the air are seen over the huts of men, wherein the inhabitants are dancing: on the earth are pigs and poultry, and in the sea the fishes are represented in a dance. I sent a very curious tablet of this sort to the Congress of Stockholm this year. The sun and the moon are the great powers in their superstitions, and their priests sacrifice to them. The priests are a separate caste, their pretended powers descending from father to son. They pretend that they can see spirits, and spirits are very much feared, especially the *manes.* If it is supposed that a spirit is playing tricks in a village, an imitation canoe is built, and after sacrificing every kind of thing in the house, which are all broken and thrown down under the house with much crying and howling, the priests prepare to rid the village of the spirit. After a fight, he is conquered and brought out to sea in the imitation boat, towed by another canoe. At a goodly distance the boat with its weird freight is let loose, and with it is supposed to depart the troublesome spirit. Wherever the boat lands, there the spirit takes up his abode, and then there is enmity between the spirit-sending and spirit-receiving villages. Generally a fight ensues.

These village fights are not often fatal. The combatants array themselves in well-padded hats, and their weapons consist of long sticks steeped in pigs' blood, and rolled in sand. The things are always kept ready in every village. When a fight is resolved on, the offended village calls on friends and relatives and prepares to settle the quarrel. Their canoes are very well built—of one hollowed log, with little sticks across, a projecting bow, and an outrigger on the right side. A couple of big canoes of this description, manned with young people provided with fighting-sticks, glide noiselessly on a dark night under the village which is to be punished. A dreadful shriek is raised, and the men, awoken from their sleep, rush down to meet the enemy. On account of the length of the weapons, the combatants proceed to an open place, and a fair fight ensues. The head is well preserved under the padded hat, and a few bruises are the only visible results of the fight. When the fight has lasted a long time, and the men of the village are getting the worst of it—being fewer in number—the women rush down with sword blades in their hands and separate the combatants. The quarrel is then made up, and ends in a feast that sometimes lasts for a long time, and usually terminates in a general scene of drunkenness. The canoes at the Nicobars are all alike, and are very well built: they only vary in size. Every evening, when the tide suits, you will see lights around the coasts: this is the men out fishing. There are generally two men in each canoe; the one paddles noiselessly forward, while the other stands in the bow of the canoe. In the left hand he holds a torch, formed ingeniously of a single dry cocoa-nut-leaf, and in the right he holds a spear. At low tides the women search the reefs for shellfish. They do not eat trepang.

When a man dies, his relatives assemble and clothe him nicely, and he is buried behind the village, with wailing. His boxes are then opened, his house is rummaged, and all that belonged to him is brought outside and destroyed.

It is not considered loyal to take any inheritance from relatives, except such things as boats, trees, and houses. Sometimes even boats are broken up. The spears are splintered, and all that belonged to the deceased is arranged in a sort of monument over his grave.

All blood relatives, even distant ones, keep up mourning for two months. This consists in abstinence from all sorts of amusements. No dancing or singing is allowed in the dead man's village; no pigs are killed, no liquor is touched, and the nearest relatives even abstain from tobacco. This is no little sacrifice of comfort on their part. When the two months are over, the mourners collect at

the grave and dig it up again. The nearest relative, wife or mother, seizes the dead body's head and tears whatever flesh or foreign matter there may be off the skull. The body is then again given over to mother-earth, but often the memory of the defunct dwells among them for many years. Many among these people are musical, and sing rather pleasingly. They make musical instruments of hollow bamboos, and accompany themselves. Their dance is a round dance, which is performed inside the cupola-formed houses. They lay their arms across each others' backs, with their hands resting on the next man's opposite shoulder, and then form a circle. One man leads, and to a monotonous tune they step out, sometimes to the left, sometimes to the right, the leader giving the direction, occasionally landing on both heels. They are, on the whole, a very amiable people. Theft is nearly unknown, and yet everything has owners. To an occasional visitor they might appear the idlest people he had ever seen, but they are not so. They are industrious, and what they do is well executed. They make neat little gardens in the middle of the forest, they build their canoes and houses very nicely, and there is much more finish about their work than is the case with most Indian produce, but they are slow workers. They esteem their women highly, and are very jealous of them. This forms one of the great and good qualities of my Nicobar friends. In the East a woman is generally a slave and a chattel, but not so at the Nicobars. A Nicobarian looks up to his mother, wife, and sister.

Only few vestiges survive of what may have been a religion once. To the sun and the moon they attribute mystical powers. They believe in a life after death, and are very much afraid of the dead. Their priests are very clever jugglers, and practice a little ventriloquism.

As the climate is debilitating, they feel a craving for stimulants. They munch betel-leaf, betel-nut, and quicklime together. The juice forms a black cover round their teeth, which sometimes increases to an enormous size, and gives their faces a horrible and ghastly appearance. Their lips never meet after boyhood, and kissing is unknown. They make toddy from the juice of the cocoa-nut tree, which they drink if they can get no arrack or rum. They are very immoderate with liquor, and it is common to find a whole village drunk. These people, though they have many good qualities, and are very able, are dying out fast, and my belief is that the arrack kills them off. The horrible arrack is brought to them from the Straits, and is bartered for cocoa-nuts. In comparison with the number of inhabitants a very brisk trade is being carried on. Before the Indian Government took possession of the islands rumours of murders and scuttling of ships were every now and then heard, and no doubt there was some truth in them; but the other side of the tale has not been told—of what injury was inflicted, and insults offered, before the Nicobarians retaliated. From what I have seen of the people, I believe that in every single instance they were provoked. The Danes tried to stop these irregularities, but they were never successful when colonizing.

The Nicobarians are great linguists: the old men talk Portuguese, middle-aged men English, young men Burmese, boys Hindostani, and all speak Malay. This shows in whose hands the trade has been for the last sixty years, and how it has changed. The Nicobarian language is spoken in different dialects. It is very guttural and difficult to speak. It is easy in construction, but does not resemble any of the surrounding languages. Of course some words are adopted, namely, of things that have been newly introduced; but, on the whole, it is a language very free from foreign elements.

In the interior of Great and Little Nicobars an inland tribe is said to live, which I believe is the same as the Chowra men. This tribe would appear to have been on the islands before the more numerous people came there. They are called the Shobaeng, and are, *I believe*, of Mongolian origin, and speak a different language. On this point I speak with a little reserve, for no European has as yet seen them in their homes, and what I know about them I learned from a young man who visited me, and who, the Nicobarians said, was of the inland tribe. He had been caught as a boy, and was certainly different from the people he was now living with. He was of Mongolian origin.

There are other reasons why I do not believe, as others do, that the Shobaengs are negritos. If I am right, then they have been driven away from the fertile alluvium on which the cocoa-nut trees grow. They are now only found on the little island of Showra, where they subsist as the potters of all the islands. At the Great Nicobar and Little Nicobar they must lead a wretched and very primitive life, being shut out from the coast and all communication with human beings.

In 1711, two Jesuit fathers went to the islands to convert the people. They were killed after a 2½ years' stay, and the only records left are a few letters from them.

In 1754 the first Danish settlement was made. Arms and soldiers were plentiful, but good food and shelter was not provided, and, after lingering for a couple of years, fever, drunkenness, bad officers, and a quarrel with the Nicobarians, ended this attempt at colonization.

In 1768 the Moravian Brethren commenced a mission to the islands. They were supported by the Danish Government, but only very slightly, and had to work hard to subsist. They suffered very much from fever and bad supplies, and after many of them had died, the mission was given up in 1787. The Moravians died so fast that they had not time to learn the language, and they did not succeed in converting the natives. During the time of the Moravian mission the Austrian frigate 'Joseph and Maria Theresa' came to Nancowry, and took possession of the place, but the colony that was commenced ended in great misery, and the missionaries had to forward the remnant to Tranquebar.

From 1787 to 1807 a guard was kept up by Denmark to secure possession.

From 1807 to 1814 England took possession, being then at war with Denmark.

In 1814 the islands were again given up to Denmark; but it was not until August 1831 that the next colonization was attempted.

The gentleman to whom it had this time been entrusted was the Rev. Mr. Rosen, a Danish Lutheran minister. He was practical and enthusiastic, and worked very hard. He had many reverses and misfortunes, suffered from fever, had at times bad food, and would no doubt have succeeded in carrying out his plans, had

the officers at Tranquebar been as persevering as Mr. Rosen. He was recalled in November 1834, and the settlement lingered on till 1837. In 1845 Denmark again made an attempt at colonizing the islands, but the matter was not put into the right hands, and it resulted in a total failure. The 'Galatea,' on her voyage round the world, started the undertaking, and left some of her officers there, but all the expenditure of lives and money was wasted. It was with the 'Galatea,' that Dr. Rink came to the islands, who has given a very well-written short description of its geology. This is the same learned Dane who has collected the folklore of Greenland.

In 1848 Denmark took her flag away, and from that time till 1869 the Nicobars had no European master. This brings us down to the present settlement. In an enterprise like the colonization of the Nicobars it is always a serious consideration whether it is likely to turn out a success. Any new arrival is almost sure to get a dangerous and obstinate jungle fever, which has had many victims in days gone by. The fate of all those who have hitherto attempted to colonize has been misery and despair, and previous settlements have invariably been abandoned. This is very true of the past, but I do not think that it is any reason why the present colony should not succeed. All previous attempts have been made without the necessary stores, without good houses, with a limited number of men, and with slow and uncertain communication with the base of operations. In the first years of the Andaman settlement the death-rate was very great; now Port Blair is a sanitarium. So will it also be at the Nicobars, when the proper drainage is completed, when the land all round the settlement is tilled, and the swamps are bunded.

The communication is now regular by steamers, the stores are supplied by Government, and are of the best sort procurable.

If once Government succeeds in making its little penal settlement healthy, settlers from Penang will not be wanting, and the place will soon thrive, for it lies on the highway of all the trade of the Bay of Bengal. In this bay terrible hurricanes often meet the ships, and there is no harbour which could offer a better shelter than Nancowry. It is sheltered from all winds, and can be entered from the west or east. It could easily be provided with docks, as there are deep and sheltered bays. The cocoa-nuts, which abound, would offer the settlers something profitable to commence with, but the best profits would be from growing cotton and spices. The edible birds'-nests, which the Chinamen prize highly, would at once bring in a little revenue, and the guano in the subterraneous caves at Katchall would be valuable for manure. There is not enough for exportation, but it would be useful for local purposes. The cotton grown at the Nicobars has been reported upon, and it appears that it is better than any Indian cotton. Every fruit planted there has succeeded well, and we know from the Danish settlements that spices thrive well. Hill-paddy gave a very good crop in 1872, when it was experimentally grown. Building materials are plentiful, and I think it is only a question of time when the Nicobars will become a flourishing colony, and, though one of the latest, perhaps not the least jewel in Her Majesty's crown.

FR. AD. DE RÖEPSTORFF.

AMSTERDAM ISLAND.

THE following account of the little known Amsterdam Island, was written after the visit of H.M.S. 'Pearl,' bearing the broad pennant of Commodore Goodenough.* The Islands of St. Paul and Amsterdam, in the Indian Ocean, are nearly on the same meridian, and about 60 miles apart, Amsterdam being the most northerly. In August 1873 the Commodore and Mr. Elwyn, a sub-lieutenant, landed, at about 9 o'clock, to leeward of a patch of kelp, and at a spot where a fault in the horizontal layers of basalt, and a consequent break up of the rock, had caused a slope of well-rounded blocks of old lava to give an easy ascent. They scrambled on shore and up the cliff. The following is an account of what they found:—"The first thing which met our eye was to our surprise a cabbage-garden. Thickly planted cabbages were standing in a deep, rich mould, thoroughly sheltered from all the easterly winds. Some plants were over 2 feet 6 inches high, and had the seed stalks of last season upon them. They could not have been cut for at least a year—possibly not for two years; and if the deserted look of the land had not already shown that there was no longer any person on shore, the state of the cabbage-garden would have been enough to prove it. But towards the upper part we soon came upon the recent tracks of a cow or bull, and here was proof of continued residence on the island. The track could not have been more than ten days, possibly not more than three days old.

"Leaving the patch of cabbages, we went towards the hut, which was about three quarters of a mile to the northward, walking near the top of the cliff to gain the more level ground. The long, coarse grass was growing in thick tussocks, making a thick matting, and fatiguing walking; and the greater part of our way the tussocks grew out from the intervals and crevices of rough scoria, which here and there formed black, rough ridges. But occasionally we crossed a hard, bare piece of old lava, still showing in its semicircular wavy ridges, like those on a drying stream of pitch, the precise form in which it cooled after an eruption from one of the many little craters standing near, some hundreds of years ago.

"At about a quarter of a mile from the cabbage-bed we found a little, level, cleared space, as if for a hut. Pieces of a white plate with a blue edge lay near it, and some bones, which Dr. Messer tells me are those of a sheep or goat, lay together not far off, much weathered by wind and sun and rain, and already some years on the ground. Some bits of tufa, suitable for building, were in a little heap on one side, away from the sea; and towards the sea, on a couple of horizontal poles, lay some dry grass, as if prepared for thatching. Mr. Elwyn thought it might be a grave, but on lifting the grass the bare ground showed beneath. It was certainly something like a *morai* of the South Sea Islands.

"Another walk of half a mile brought us in sight of the hut. We sprang forward, thinking that perhaps a skeleton, if not of a man, yet of some of the cattle, might be within. There was no sign of life about it. A trestle-bed stood behind the framework of a partition at each end. Some feather-bedding, rolled up and tied with string, was in a corner, with a couple of old broken and mended easy-chairs. A deal box

* See our number for February 1874, p. 474.

full of gear lay on the ground to the left, and a trunk rested on the bed to the right. After a glance round, Mr. Elwyn began to turn over the gear to the left, and I opened the trunk to the right.

"The hut was about 30 feet by 14 or 15. A wall, about 4 ft. 3 high, of lumps of tufa, cemented with a sort of pozzuolana earth; a well-thatched roof of rafters of rough wood from the trees in the neighbourhood covered it; at the south end, and against the slope of the hill, was a semicircular pen, which might have been for a pig or two. Rough steps were cut into it. A semicircular wall to the east enclosed a place for fire. A large scuttle-butt, to which there was a well-worn path, stood 40 yards N.E., and to the N.W. a flag-staff was planted in a heap of scoria. Empty barricoes, an old pigeon-house, and sundry odds and ends, were strewn in front of the house, which faced the east.

"The only piece of decidedly ship's timber that we could see was a piece of a studding-sail boom or mast, which supported the ridge pole of the roof at the north end.

"The contents of the box on my side were soon examined. They were a dozen volumes of educational books, all in French, and each with the name of Eugenie Clochard, or Melina Clochard, within the cover. On Mr. Elwyn's side, the strong deal box contained two or three large, round, white French dishes, white tureen or dish covers, the *Mysteries of Paris*, in the usual bright yellow paper cover, a manuscript diary in pencil, from December the 27th, 1870, to January the 19th, 1871, a receipt for 15 francs to one Jacques Bastide, and a manuscript list of names and residences, many of the names being native names of some southern country, possibly Madagascar, such names as Montoncala, Singainy, Vaïtilingani, Tanacoudy, having a sound of Malagassy in them. There was also a book with a woman's name in the cover, and then *Ile de Maurice, partie pour Madagascar*.

"Mr. Elwyn also turned out a large round button of a woman's velvet jacket, some shreds of a woman's dress, and some gridirons and cooking-pots. A rusty old gun and stock, double-barrel and muzzle-loading, was found under the box—a French one by the swivel for a sling on under part of stock.

"At 20 or 30 yards from the hut, and to the west of it, a long, hollow rift in the rock formed a most convenient cave for shelter. It ran about N.N.E. and S.S.W. In places the rock formed a natural roof to it. At intervals it was open to the sky. The lower end to the N.N.E. was fenced off by a wattled fence of reeds, and within the fence a ledge had evidently been used as a bed-place. A quantity of dry grass was heaped up upon it. Near the mouth were bird's feathers, limpet shells, legs and claws of small crabs, hair of a goat or hairy sheep. From a passage in the diary, I think that the uncovered part of this hollow, which was about 15 feet wide on the floor, had been used as a garden. A thick bed of mould covered it and was well suited to it.

"Round the hut were many tracks of cattle and sheep or goats, but none of men. One foot-print of a calf or heifer looked quite recent, and, having looked carefully at these, we turned back to the cabbage-garden landing-place, taking a line rather higher up the hill, in order to gather some branches from the only trees we could see growing, and which might have been 50 or 60 years old.

"We were at the boats in a short time, and on board the ship about four hours after leaving her. What conclusion was to be drawn from all that we had seen?"

"The notice for the 'Pearl's' visit to Amsterdam was the following:—

"'Mr. F. R. Lee, R.A., in his packet the 'Linda,' left the Cape of Good Hope on about the 18th of October, 1872, and passed the island of Amsterdam. He found it impossible to effect a landing in consequence of the heavy surf, but while cruising close to the island, strange sounds were heard as if proceeding from a fog-horn or a speaking trumpet. It was Mr. Lee's opinion that there were people on the island, but all his efforts to discover them or bring them within observation, were without result.'

"A paragraph, nearly in these words, appeared in the *Melbourne Argus*, and was copied into *Galignani's Messenger* of March 5th, 1873. Having been read by a Mr. J. Sohier, of Nantes, that gentleman thought that possibly some of the passengers, by the 'City of Sydney,' supposed to have been lost hereabouts—perhaps his own brother, a passenger by that vessel—might remain alive on the island, and he begged his London correspondent to appeal to the Admiralty, to allow a vessel to call and ascertain if any persons were living there.

"Who are the people who *have* lived there? The house is strongly and roundly built, with a good amount of labour; the cabbage-garden has been liberally planted, at a distance of a mile, by a rough road. Cattle, goats, and pigs have been carried there. All this must have been done by people in strength, and with plenty of food to keep it up. The diary is not that of a castaway, but of a voluntary resident, who had carried his seeds with him, and had time and strength to make a well.

"He was probably one of the party who have long worked the seal fishery of St. Paul's, and had probably come up to Amsterdam to found a branch establishment. The beds and gear were not left in a hurry or abandoned, but were made up by people who meant to return to them or to carry them away, and to judge from the state of the cabbages, they must have left more than a year ago. Some castaways *may* have occupied the hut for a time; and the girl's schoolbooks, the list of names, the receipt, still more the fragments of women's clothing, would seem to show that this has been the case—but all must have left long ago."

Until this year it was believed that the Dutch navigator Vlaming discovered Amsterdam Island in 1696. But this year Lord Stanley of Alderley in his *First Voyage Round the World by Magellan*, edited by the Hakluyt Society, has fully established the fact that the Island of Amsterdam was discovered on March 18th, 1522, by the 'Victoria,' the first ship which ever sailed round the world. This is recorded in the *Derrotero* or log book of the voyage of Magellan by the pilot Francisco Albo (or Alvaro?) the original of which is preserved at Simancas. He says:—"On the 18th of March I took the sun in 49½°, it had 2° 55′ declination, the latitude came to 37° 35′, and whilst taking the sun we saw a very high island, and we went towards it to anchor, and we could not fetch it, and we struck the sails and lay to until next

day." He says the island is in 38° S., that it is uninhabited, and has a circumference of a matter of 6 leagues. The true latitude of Amsterdam Island is 37° 52′ S.

The Dutch navigator Vlaming sighted the island in 1696, and anchored, as he says, in 16 feet, on the south side, about a gun-shot from the shore. In Deutrecasteaux's voyage, quoting Vlaming, it is said that the seals were so numerous that he had to use the butt of his musket to keep them off. There are plates of Amsterdam and St. Paul Island in Valentyn's Dutch work on the East Indies, which have been reproduced in Lord Stanley of Alderley's *Voyage of Magellan*.

Rear-Admiral Burney says that Deutrecasteaux passed the island, in March 1792, and made sketches and a plan, which are very fairly accurate. He describes the island as being on fire, and supposes the grass and trees to have caught, and that there was no volcanic eruption. Even at that time he had heard that sealers were engaged in the fishery of this island and St. Paul's.

The next notice of it is to be found in an account of the settlement of New South Wales, by Colonel Collins, the Judge-Advocate General of the Colony. He says that, in January 1796, a storeship, the 'Ceres,' arrived. She had touched at Amsterdam, and had brought away two Frenchmen and two Englishmen, who had been left by a brig to carry on the fishery. The brig having been taken by the 'Lion,' an English ship, and carried to China, these men had remained for three years on the island, living for the last eighteen months on the flesh of the seals whose skins they cured. One of the Frenchmen, a M. Perron, is spoken of as a person of some education. He had kept a minute and well-written journal, and had made some sketches.

In October 1837, Captain Wickham, in H.M.S. 'Beagle,' determined the position of Amsterdam Island to be latitude 37° 52′ S., and longitude 77° 36′ E., within 4 miles of the position as given by Vlaming, and within 8 miles of that given by Magellan's pilot. The highest point is 2760 feet above the sea. In 1838 two of the South Sea sealing-vessels owned by Messrs. Enderby, the schooner 'Eliza Scott' commanded by Mr. J. Balleny, and the cutter 'Sabrina' Mr. H. Freeman, touched at Amsterdam Island.*

There are, no doubt, other accounts of visits to Amsterdam Island, although they are not to be found on board the 'Pearl.'

The parts of these accounts to be noticed are that Vlaming and Deutrecasteaux both speak of great quantities of seals, whereas the 'Pearl' saw none, though she ran half round the island, and on Deutrecasteaux's track, about half a mile off shore. Horsburg speaks of the island having been formerly covered with forest, which has been burnt down, and Deutrecasteaux speaks of brilliant vegetation on the south side, and a vast fire on the north. Horsburg's paragraph is evidently framed on these two statements, but I very strongly doubt the existence of forest. Alvaro, Magellan's pilot, distinctly says—"the island has not trees at all." The few trees seen from the 'Pearl' lay in sheltered hollows on the north-east side of the island, the parts not seen by Deutrecasteaux. The bare, storm-driven mountain side on the north and southern slopes could not support a tree. Probably the conventional marks for trees given in a sketch by Valentyn, a companion of Vlaming, are the authority for Horsburg's mention of a forest. A very important and interesting fact in botanical geography has, however, been brought to light by this visit to Amsterdam Island. A shrub, called *Phylica arborea*, was found growing, which had previously been supposed to be peculiar to Tristan d'Acunha in the Atlantic. The two isolated rocks are separated by the continent of Africa, as well as by the intervening ocean.

Deutrecasteaux's fires seemed also doubtful, but an entry in the diary *Le feu dans l'Erbes* suggests that in February, the southern August, the thick tussocky grass would die down. The damp remaining in it would be very likely, indeed, to cause spontaneous ignition, and a fire of grass would blaze and smoke vigorously for two or three days. Deutrecasteaux passed in March, the southern September, and the very time for such a fire to take place.

* See *Royal Geographical Society's Journal*, ix., p. 517.

SOME UNSCIENTIFIC NOTES ON THE HISTORY OF PLANTS.

WHEN the writer of these lines was a cadet at Addiscombe there was in great favour one of those compositions which are apt to be so depressing to those who have left behind the cadet stage of existence, and which are known as comic songs. The humour of this one consisted in introducing obvious anachronisms, followed by a refrain to the effect:—"at least it would have been so—only it was not invented till after that." *E.g.* Guy Fawkes figured as crossing Westminster Bridge—"at least he would have done so—only it was not built till after that!"

This refrain was brought to mind by an interesting letter from Dr. Birdwood, which appeared some time ago in the *Athenæum* (Oct. 31st), on certain apparent representations of the custard-apple on the walls of the Ajanta caves, representations dating, according to the best authority (Mr. Fergusson), not later than the 7th or 8th century; whereas the *Annona squamosa*, or custard-apple, in the words of the refrain, "wasn't invented till after that;" being a native of the Antilles. The present writer, not having seen the drawings in question, ventures no suggestion on the subject, and the only contribution that he can make to the specific history of the custard-apple is to relate an Indian story or apologue, which he heard very long ago—though not indeed long enough ago to establish the existence of that fruit in India before the discovery of the Antilles.

Once upon a time it was announced that the Pádsháh was about to pass through a certain remote village of Upper India, and the village-heads gathered in panchâyat, to consider what offering they could present on such an unexampled occasion. Two products only of the village lands were deemed fit to serve as *nazrâna*. One was the custard-apple; the other was the wood-apple *(Feronia elephantum)*, a wild fruit with a very hard, shelly rind, something like a large lemon or small citron converted into wood. After many pros and cons, the custard-apple carried the day, and the village elders accordingly, when the king appeared, made salám, and presented a large basket of custard-apples. His majesty did not accept the

offering graciously, but with much abusive language at being stopped to receive such trash, pelted the simpletons with their offering, till the whole basketful had been squashed upon their venerable heads. They retired, abashed indeed, but devoutly thanking heaven that the offering had not been of wood-apples!

Dr. Birdwood's remarks reminded me of certain passages in which the existence of another American fruit in the old world, long before the days of Columbus, is assumed to be recorded. I speak of the Pine-apple.

In Professor Rawlinson's *Ancient Monarchies* (vol. i., p. 578) it is stated in reference to ancient Assyria: "Fruits . . . . were highly prized; among those of most repute were pomegranates, grapes, citrons, and apparently *pine-apples*." A footnote adds: "The representation is so exact that I can scarcely doubt the pine-apple being intended. Mr. Layard expresses himself on the point with some hesitation (*Nineveh and Babylon*, p. 338)."

The cut on the succeeding page is somewhat like a conventional representation of a pine-apple, though it seems to me by no means so exact as it does to Professor Rawlinson.

Again, in Mr. Winter Jones's translation of the Travels of Nicolo Conti, as printed in the Hakluyt Soc.'s volume *India in the XVth Century*, edited by my friend Mr. Major, the traveller (circa 1420-1430), speaking of a place called Panconia [in other readings Pauconia, Pancovia, Paconia], which seems to be, as the editor points out, Pegu (properly Bagó), tells us: "They have *pine-apples*, oranges, chestnuts, melons, but small and green, white sandal-wood, and camphor." As there is no *caveat* appended, I presume that the translator here intended what is meant by pine-apple in modern English, and which used to be in our youth, before the days of ocean steamers and penny slices, the symbol of Apician luxury in England, viz., the *Ananassa sativa*.

In both these cases, surely, there can be no doubt that the fruit intended, whatever it be, is not the *ananas*, "for this wasn't invented till after that," and it has, I believe, carried the American name, which we have just used, along with it round the world.

The term *pine-apple* was, indeed, good English long before the discovery of America, but it meant what is now called a pine-*cone*, and in Scotland a "fir-top." In a list of plants "*for an herbere*," quoted by Mr. Thomas Wright from a fifteenth century manuscript in the British Museum, we find among others "date-trese (?), peche-trese, *pyne-appulle*." * This is the only sense given of *Pine-apple* in *Minsheu's Guide into Tongues*, 2nd ed., 1627. The name of *Pine* was given to the ananas by the Spanish discoverers, of course from its resemblance to the other natural production; but in the cone of the Italian stone-pine this resemblance is far closer than would be suggested by any English species, the cone of the stone-pine, besides its great size and solidity, having the same tendency to a cylindrical form which you see in the ananas. The resemblances and differences are detailed at length by Oviedo (see *Ramusio*, vol. iii., ed. of 1556, f. 135 v.)

I cannot suggest what the Assyrian figure was intended for; scarcely for a pine-cone. But Conti certainly intended pines in the ordinary sense. The words of Poggio's Latin are simply *pinus habent*.

What were these pines? It is not certain that he meant a fruit at all, or he would probably have said *nuces pineas*, or the like; he may have meant trees only, as were the white sandal-wood trees (*Santalos albos*) of the same clause. Pine trees do grow in our province of Pegu, but only, I believe, in the hill-country near the Salwen. If a tree be meant, probably it was the *Casuarina muricata*, which is indigenous on the Burmese seaboard, which has a good deal the appearance of a species of pine, and which Mason says the natives call by the same name as the pine. If a fruit be meant, it is not easy to say what. The likest in appearance would be that of a *pandanus*, or screw-pine, which has been so called, I imagine, from the general resemblance of both fruit and leaves to the pine-apple (*ananas*).* No species of this appears to afford food in Pegu, but as Mason says that the fruit of one species is used "to hackle thread," Conti might have seen it in the bazars for sale.

There is also a scaly fruit, looking much as if it were covered with the skin of a carp, which I have seen and tasted in Java. This is the fruit of a kind of rattan (*Zalacca edulis*, *sálák* of the Javanese), and grows also in Pegu or Tenasserim.

The late M. Pauthier, in a translation from the Chinese, has a passage which, if correct, would carry, not pine-apples, but tobacco, back to the age of Chinghiz Khan, nearly 300 years before Columbus. In his version of the *Voyage de Khieou* (or Chang-Chun) in *Journ. Asiatique* for January 1867, this traveller through Central Asia is made to say:—"They then began to meet men who smoked tobacco (*yen*), in collecting that which fell upon the ground" (p. 44). The translator makes no comment on this remarkable statement, which (omitting the manna-like descent) reminds one of the story in Herodotus, of certain Scythians who intoxicated themselves by the smoke of a certain fruit, and will, probably, be quoted some day in connection with the clay-pipes of the Firbolgs, which I remember seeing long ago in the Museum of the Royal Irish Academy, as well as certain iron pipes which I have seen in the late M. Troyon's Museum on the Lake of Geneva.

It is remarkable, however, that Dr. Bretschneider of Peking, who has lately published an English translation of the travels of Changchun,† gives nothing about smoke or tobacco, and, in his version, instead of: "they then began to meet men who smoked tobacco," we find: "*where we began to find settlements.*" He explains, in his prefatory remarks, that the word *yen* here means, not tobacco smoke, but the smoke of habitations! This gives one a serious view of the difficulties of translation from the Chinese, and of the danger of hasty deductions from such translations.

One more suggestion of an historical possibility in connection with the vegetable world. The European words for a poplar tree (*Populus*, *Pappel*, &c.) strongly resemble *pippala*, the Sanskrit name for the *Ficus religiosa* (*Hind. Pipal*); and that tree has in its foliage a very strong resemblance to some poplars, especially the aspen. May it not be possible that the

* *History of Domestic Manners and Sentiments*, 1862, p. 301.

* Conversely, according to Crawford, the Macassar people call the ananas *Pandang*, from being so like the Pandanus (*Hist. Ind. Arch.*, i., 428.

† In the *Chinese Recorder and Missionary Journal*—Shanghai, 1874, see pp. 122 and 178.

Aryans, on meeting with the *Ficus religiosa* in the Indian plains, gave it the name of a tree which it strongly recalled, and which they had known in a previous stage of migration? I once made this suggestion to a very learned man, but it was rejected somewhat contumeliously, and the resemblance between the two trees was disputed or denied.

There may be better reasons against the suggestion, but I admit no doubts as to the superficial resemblance. It is so strong that Frenchmen are apt to call the *pipal* "*peuplier d'Inde*." Of this I have met with several examples; I may quote Bishop Pallegoix's book on Siam (i. 86; and 140).* Moreover here in Palermo, some years ago, I saw a young pípal tree in the Butera garden (since destroyed). The gardener gave it the same name, *pioppo delle Indie*. And more lately I have found that my suggestion of the identity of *pippala* and *Populus* was anticipated by a professed botanist, the late Major Madden of the Bengal Artillery. And he mentions that the *Populus ciliata* is called by the people in Kumaon *Gar-pípal*.†

Pass we to oranges. The ordinary large orange is sometimes called in Hindustání *Sangtarah*, and the usual explanation of this (the suggestion occurs in Shakespear—not William but John) is that it is a corruption of *Cintra*. The term *Sangtara*, however, occurs in Baber's commentaries,‡ and on this account some have doubted whether Cintra oranges could have been known by that name in India so early. And I remember this being discussed by Sir Henry Elliot on the only occasion on which I ever met that lamented scholar and statesman. He suggested that the derivation of *Sangtarah* might be *Sang-tar* "green stones" (or moist pips in fact).§ It is probable, however, that Shakespear is right. For two centuries before Baber writes Abulfeda, as done into French by M. Reinaud: "Au nombre des dépendances de Lisbonne est la ville de Schintara; à Schintara on recueille des pommes admirables pour la grosseur et le goût" (p. 244). And, on this Saracenic soil where I write, the only usual name for these oranges is *Portugalli*, which no doubt is the sense of the name which travelled further east as Schintara or Sangtara *pommes*.

In turning up that illustrious book, Erskine's Baber, for the preceding reference, I came on what he says of the Jack-fruit: "It looks like a sheep's stomach stuffed, and made into a haggis .... The fruit is very adhesive; on account of this adhesive quality many rub their mouth with oil before eating them. They grow not only from the branches and trunk of the tree, but even from its root. You would say that the tree was all hung round with haggises."‖ This inimitable description brings back my own amazement when I first saw a jack-tree hung with fruit. I am grieved to say that I never tasted the latter, and hence did not know about the "adhesiveness" (which mortal men in these less Johnsonian days call *stickiness*). Hence I was perplexed by Friar Odoric, who mentions the same circumstance, saying: "*and when you eat these, it is just as well to oil your hands and your mouth.*" *

To return, before concluding, to the custard-apple and pine-apple. Both of these appear in the *Ain-i-akbari*,† as does also the Guava, all three of American origin. The author says that pine-apples were called *Kat'hal-i-Safari* or "jack-fruits for travels, because young plants put into a vessel may be taken on travels and will yield fruits." *Pace* Abul Fazl, this reads like nonsense. I know that guavas in India are still often called *Safari Am* or "Journey mangoes," and one would be inclined to seek the explanation of both names in the journey the fruits *had* made—"*peregrini*," if idiom will admit. A note, quoted by Mr. Blochmann from Jahangir's memoirs, shows that the pine-apples at the Mogul court came from the Portuguese settlements on the western coast. To one who has seen the hundreds of acres of pine-apples on the islands about Singapore, or the seemingly wild profusion of them in the valleys of the Kasia Hills,‡ it is difficult to conceive them of foreign introduction; as difficult as it is to conceive of Mediterranean cookery without tomatas, or stony Sicilian slopes without cactuses. Yet both these are also from America.

When at Batavia in 1860, my morning walk often led me past a signboard which bore the words *Stoom Ananassen*. What these "Steam Pine-apples" were I have never been able to learn, or even to imagine.

I see from Crawford's Dictionary that in the Malay regions the custard-apple is called *Nona*, which seems to be the American name, whence, and not from its being ever regarded as the staff of life (as Dr. Birdwood seems to think), it is called *Annona*.§ Neither Annona nor Ananas is mentioned by Baber among Indian fruits; I mean neither by these names nor by any others.

H. YULE.

* The Bishop transposes the names of the two well-known Indian figs, calling *pipal* what is really the banyan. But it is the true pipal that he calls *peuplier*.

† *J. A. S. B.*, xvii., part i., p. 381.

‡ Erskine's, p. 328.

§ This circumstance was recalled in Section E. of the British Association at Edinburgh in 1871, by an old friend who had been present at the same time, then Lieutenant, now (alas Posthumus!) Major-General Richard Strachey, R.E., C.S.I., of the Indian Council.

‖ The new translation into French is here so inferior in graphic accuracy that we must really hope it does not better represent the original: "Il pousse non seulement sur les branches de l'arbre, mais encore sur le tronc, où il fait l'effet de bourses qu'on y aurait suspendues."—(II., 211).

Deep-Sea Soundings in the Pacific.—Captain Erben of the United States' steamer 'Tuscarora,' lately commanded by Captain Belknap, has just completed a series of soundings between San Francisco and Honolulu in the Sandwich islands. At the first cast, a short distance outside the Farallones, bottom was reached in 435 fathoms. The depth then gradually increased to 2561 fathoms. In latitude 33° 10′ N., longitude 132° W., it shoaled rapidly, and 5 miles further, in latitude 32° 58′, it was found to amount to 385 fathoms only. Thirteen casts were taken here within a radius of 5 miles, and these, as well as the lava and coral brought up by the lead, clearly proved the existence of a submarine volcano, rising to a height of about 13,000 feet above the general level of the ocean bed. On leaving this spot the depth increased rapidly, and in latitude 24° N., longitude 152° W., it attained its maximum, viz., 3115 fathoms. The temperature of the sea water at the bottom was found to vary very little from 35° or 36° Fahrenheit.

* See *Cathay*, &c., p. 79.

† See Blochmann's Translation, I., 66, 68.

‡ When the writer knew the Kasia Hills—no matter how many years ago—100 pine-apples cost a shilling.

§ *Anon* is the name as given by Oviedo.

Reviews.

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MERCHANT SHIPPING AND ANCIENT COMMERCE.*

THE production of these volumes has been a labour of love to the author—who certainly knew his true vocation in life when, at an early age, almost fifty years ago, he ran away from home, and joined a ship sailing for the West Indies as a cabin boy. His rise in the merchant service was rapid, for already at twenty-one he commanded a bark trading between Bushire and Bombay. On quitting his sea life he set up as a shipowner in England, and was so successful in his new business, that he was able to unseat Mr. Hudson as a Member of Parliament for Sunderland, and maintain his seat for that great shipbuilding town for seventeen years after. In fact, he only gave up the representation of that on account of the failure of his health; and since then has devoted himself to working up the history of his own profession. Although familiar with most subjects relating to Merchant Ships, Mr. Lindsay has naturally found it alike necessary and desirable to look to others more intimately trained to letters than himself, for aid in the preparation of his work, and he especially acknowledges in his preface the valuable assistance he has received in connection with the two volumes now presented to the public from his friends Sir Patrick Colquhoun, Q.C., and Mr. Vaux, F.R.S. Mr. Lindsay proposes, as he says in these volumes, which comprehend only half of his whole scheme, to lay before his readers a complete history of Maritime Commerce, extending from the earliest period to the launch of the last great steamer from Messrs. Laird's yards this year. In carrying out this scheme he has given many and very interesting details of the origin of boats of all kinds, from the days when our primitive parents disported themselves on logs and coracles, to those when the galleys of Venice and Genoa swept the Mediterranean in the pursuit of a commerce not always legitimate. In the pursuit of his general subject Mr. Lindsay has much to say on commercial intercourse other than that obtained by the aid of shipping, and perhaps, therefore, not the least valuable portion of his first volume is that which he has devoted to a minute and careful account of the early caravan-routes across Asia and Africa, illustrated, as they are, by an excellent map, drawn under his own eye. Having discussed at considerable length all that has been done on land by the ship of the desert—the camel—Mr. Lindsay then addresses himself to that part of his main subject with which, as an old sailor, he is naturally most familiar—the various sea voyages undertaken with the view of bringing the legendary wealth of the East into the eager markets of the West, from the days of King Solomon to the establishment of Alexandria as the great emporium of the nations of antiquity. In this, from its wide range, necessarily rapid survey, comprehending as it does, not only the coasts of India and the Red Sea and Persian Gulf, but also the East Coast of Africa as far south as Sofala, Mr. Lindsay deals with many speculations from the days of Herodotus to Humboldt, and endorses the view of the latter philosopher, that the traditionary story of the circumnavigation of Africa, which the Greek historian ridiculed, presents no improbability to those, who, like himself, have "gone down into the sea in ships." Passing on, Mr. Lindsay sketches the history of the early commerce of India and Ceylon, and the Golden Chersonesus and Java. In 1838, the author, when in command of the 'Olive Branch,' in the Persian Gulf, frequently traced the course of Alexander's fleet under Nearchus, and is peculiarly able to appreciate the dangers and difficulties which the Greek admiral must have experienced. Moreover, like Alexander's fleet, he had often to anchor his bark for the night, owing to the intricacy of the navigation, and was himself attacked by the lawless robbers of the sea coast—just as the Greek sailors were on the same spot, near Bushire, more than 2000 years before.

Mr. Lindsay next traces the commerce of the West in Roman and mediæval times, and enters into a full and elaborate investigation of its development in Genoa, Venice, Britain, and America, giving at the same time comprehensive narrative of the voyages and life of Columbus. Not the least valuable part of this portion of his book is his examination of the maritime laws of different nations during the mediæval period, especially of the Rôles d'Oléron, and his sketch of the lives, manners, habits, and practices of the sailors of those days. It will be important to remark the great change for the better in the condition of merchant sailors that has since taken place, although it has been almost wholly brought about only during the present generation. The whole tendency of legislation for the merchant navy has in our time been unquestionably for the comfort of the sailor, and therein for the general benefit not only of those employed in the navigation of vessels, but of their owners, and of the nation itself. We do not now brand on the forehead, or slit noses, or "keel-haul," but the services our sailors render are not thereby less efficient. Mr. Lindsay devotes his ninth chapter to the methods of ancient rowing, and to the reasons which he thinks prevailed with the ancients in their classification of galleys, as triremes, quinqueremes, octoremes, &c., and though he may not have altogether solved this vexed problem, the credit is due to him of having spared no pains in its investigation. The probability is that there is some double or latent meaning beneath the names which have been handed down to us from ancient times, and that we shall not arrive at any certain conclusion on this subject until we have an opportunity of making researches far wider and more exhaustive than any that have yet been undertaken. Sooner or later, possibly, some sculptured monuments may be unearthed, giving a clearer notion than we can have at present as to the disposition of the oars, and of the rowers for classes of ships larger than the bireme. How this was done in the case of such ships, of only two banks of oars, we can form some idea from the sculpture at Nineveh, of which Mr. Lindsay has given a drawing (p. 276); but for all above this size we can have no certainty, as the documentary evidence in ancient writers is on this head hopelessly obscure. There must be many of these galleys lying intact down in the ooze of the Mediterranean, which might

* *History of Merchant Shipping and Ancient Commerce.* By W. S. Lindsay. In four volumes. Vols. I. and II. Sampson Low & Co. London, 1874.

possibly be got at by dredging and submarine excavation.

In his second volume Mr. Lindsay gives much interesting information on the progress of maritime discovery, and especially of the results of the famous voyages of Vasco de Gama, Sebastian Cabot, Hawkins, and Drake, to the time of the peaceful and scientific researches of Dampier and Cook, proving as to Cabot, from documents only recently made known, that the discovery of America, as distinct from the islands of the Gulf of Mexico, is strictly due to the enterprise of Englishmen. It is now certain, though the fact in no way detracts from the merits of Columbus, that North America was discovered by Cabot and his party, Columbus not having reached the mainland of the continent until his third voyage in August 1498. On the other hand, he shows no less clearly, that if we have some reason to pride ourselves on the daring and zeal of the early English navigators, the eternal infamy of having introduced, and for years promoted, the Slave Trade in America, is as certainly due to Queen Elizabeth, and the piratical captains and bold buccaneers who sailed under her ensign.

In the fifth chapter of the second volume Mr. Lindsay has given us a carefully worked out history of the English Navigation Laws, as first introduced by Cromwell, and promoted with even greater strictness on the restoration of Charles II., and after the separation of the United States from this country. On this branch of his subject, Mr. Lindsay writes in a fair and liberal spirit, not shrinking from stating unreservedly the commercial errors which the policy of 1652 entailed upon this and other nations; but at the same time, in opposition to many with whom he cordially acted during the several years when he represented Sunderland in the House of Commons, maintaining firmly that, with the restrictive policy of the Dutch and French in full force, England had no alternative but to impose her stringent navigation laws. That the times have so much changed that this, the last rag of protection, has been swept away, is, it need scarcely be added, a source of the deepest satisfaction to our author. In chapters 7, 8 and 9, we find a long and accurate account of the commercial relations betweeen England and the rest of the world during the terrible war with France, and a full statement of the effect of the English "Orders in Council," the necessary reply of this country to the manifesto of Bonaparte known as the "Berlin Decree." Mr. Lindsay handles the somewhat delicate matters arising out of the complications between France and America, and America and England, with equal tact and good sense, at the same time frankly asserting, where necessary, the right of this country to act always according to the dictates, as understood and expressed by a free Parliament, of her own interests. An old Whig, in some respects even an advanced Liberal, Mr. Lindsay sees merit in the pluck and English dauntlessness of Pitt's administration, whilst he condemns as unreservedly the shuffling policy of the Whig opposition with reference to the Orders in Council, and the short-sighted subservience of the rulers of America to the imperious views and wishes of Bonaparte. Bonaparte, as everybody knows, failed utterly in his Russian campaign, and Barlow died in Poland, and the Americans found themselves at war with England on grounds which not one of their historians ever ventures to defend, and which their statesmen of to-day would heartily repudiate if war, on such shallow and selfish pretences, was again attempted. In his 12th chapter Mr. Lindsay has brought together a complete and succinct account of the origin and progress of the Dock system in England, compressing into a few clear and readable pages much that is scattered through Blue Books and other ponderous tomes. He adds an admirable map of the existing docks at Liverpool, one of the most remarkable results of man's ingenuity and power to be met with in the world. The 13th chapter is an impartial narrative of the successes and misfortunes of the East India Company, from their earliest days to their final extinction as a great trading body in 1834, —a narrative which will be new to many readers who have, perhaps, imagined that the greatness of this Company resulted from their commercial operations. Mr. Lindsay brings out clearly that it was as a great political, rather than a great commercial, corporation that the Company flourished so splendidly. It but illustrated the immense capacity, as fresh now as ever, of the English race for imperial rule. The last (14th) chapter contains a most interesting account of the ordinary duties of merchant officers and seamen, ashore or afloat, with some notice of the various changes that have taken place in the internal economy and administration of ships from the time he entered the service some forty years ago. He has added a remarkable note to page 497, in which he gives a portion of his own personal experiences when an "apprentice" in the trade between Demerara and England. It can be compared only to the anecdotes of Fielding and Smollett a century earlier. The admirable and authentic illustrations scattered through Mr. Lindsay's volumes greatly enhance their value. Amongst the number are many woodcuts from Mr. E. W. Cooke's *Etchings of Shipping and Craft* (London, 1829). Two more volumes will shortly appear and complete Mr. Lindsay's work, and will be devoted to a comprehensive history of steam and steam navigation to the present year.

GEORGE BIRDWOOD.

Cartography.

Kiepert's New Map of Palestine.*

THERE is probably no geographer better qualified than Professor H. Kiepert of Berlin to produce a map of Palestine. To him we are indebted for the maps accompanying Robinson's standard works and to many others referring to Syria and Western Asia generally, and he has been fortunate enough to have been able during a journey to the East, in 1870, to clear up some doubtful points of geography on the spot. The map before us is based upon the most recent researches, including the labours of the Palestine Exploration Fund, as far as they have been published, and Warren's reconnaissance of Ammon and Hesbon, which the author was permitted to copy when at Jerusalem. We share Dr. Kiepert's regret that Wetzstein should not yet have published the results of his journey into Jolan and Jedur, which would have filled up an awkward gap in the very centre of the map, and are not surprised to hear that personal obser-

* H. Kiepert, Neue Wandkarte von Palaestina. 8 sheets. 1 : 200,000. Size 49 by 78 inches. With notes. Berlin, 1874. (London, Trübner). 8s. in sheets; 16s. 9d. mounted, on rollers.

vation on the spot confirmed the opinion of other travellers as to the untrustworthiness of Van der Velde's map. Dr. Kiepert's map is very tastefully printed in colours. The hills are effectively shaded in chalk, permanent rivulets are coloured blue, torrents (wadis) are shown in black, fertile tracts are tinted green, deserts pale brown. Great care has been taken in the identification of places, and speculative identifications, based merely upon a supposed resemblance of a modern name to some ancient one, have very properly been rejected. The identification of Gezer, by Ganeau, of Tarichea by De Bruyn and Quandt, of Sephath and Kades Barmea by Palmer and Drake, of Lita with the modern Litane (of which Leontes is a corruption) by Noeldeke, and many others have been taken notice of, and in this respect, as well as in the general correctness of the topographical features, Kiepert's map is certainly superior to the one in Smith's Atlas. The nomenclature distinguishes between the Hebrew names of the Old Testament, old names used in a Grecised form, Greek, and modern names, and is amply sufficient for purposes of biblical study. A marginal map shows the boundaries between the twelve tribes and the Levitical cities, and there is likewise a plan of Jerusalem, based upon Major Wilson's survey. Kiepert, after an examination of the locality, is of opinion that Robinson's and Schulz's hypothesis respecting the third wall is erroneous, and accepts Krafft's identification of the ancient outer wall with the existing northern wall of the town.

Two smaller editions of this map are being prepared for publication, the one, a wall map for the use of schools, on a scale of 1 : 300,000, the other a hand-map, on a scale of 1 : 800,000, and if this latter contains the whole of the information of the larger wall-map, it cannot fail to become a favourite with biblical students.

E. G. RAVENSTEIN.

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French Admiralty Charts.

Published by the Dépôt de la Marine.

Skagerak. Fjord de Christiania. Par E. Morin. Paris, 1874. 1s. 8d.

Côte nord d'Espagne: Santander. Par Hémery. Paris, 1874. 1s. 8d.

Terre Neuve. Côte ouest. Anse de Petitpas dans la rivière Humber. Par Wuhrer. Paris, 1874. 5d.

Amérique septentrionale. Côte orientale. Ile de Sable. Par Hémery. Paris, 1874. 10d.

Amérique septentrionale. Caroline du Nord. Entrées de la river du cap Fear. Les bancs au sud du cap Fear. Par Hémery, d'après Ploix. Paris, 1874. 1s. 10d.

Antilles: île de la Dominique. Baie du Prince Rupert. Par P. Méa. Paris. 1874. 7½d.

Antilles: île de Saint Dominique. Baie Manzanillo. Par P. Méa. Paris, 1874. 7½d.

Antilles. Ile de la Jamaïque. Port Morant. Par Hémery. Paris, 1874. 7½d.

Mer des Antilles. Etats-unis de Colombie. Port Carreto. Par A. Martin. Paris, 1874. 5d.

Mer der Antilles. Côte du Venezuela. Anse de Carupano. Par A. Màrtin. Paris, 1874. 5d.

Mer des Antilles. Côte du Venezuela. Port de Chichirivichi. Par A. Martin. Paris, 1874. 5d.

Algérie. Carte de l'île de la Galite. Par P. Méa. Paris, 1874. 10d.

Algérie. Iles Habibab. Par Méa. Paris, 1874. 10d.

Côte sud-est de Madagascar. Fort Dauphin, Loucar, Sainte-Luce. Par P. Méa. Paris, 1874. 1s. 8d.

Côte ouest de Madagascar. Baie de Bembatooka. Par F. Dufour. Paris, 1874. 10d.

Côte orientale d'Afrique.—Côte et port de Zanzibar. Par Dufour. Paris, 1874. 10d.

Mer Rouge. Plan de la rade de Djeddah. Par E. Hémery. Paris, 1874. 10d.

Mer Rouge. Port de Sawakin ou Souakin. Par E. Dufour. Paris, 1874. 5d.

Mer Rouge. Mouillage des îles Safajah. Port de Massoua. Par E. Dufour. Paris, 1874. 10d.

Plans de la Mer Rouge: Khor Dhu-i Lawa.—Ile Disci—Khor Shinab. Par E. Dufour. Paris, 1874. 5d.

Plans dans la Mer Rouge; port de Tor ou Tur.—Sherm Wej'h.—Iles Frères. Par E. Dufour. Paris, 1874. 5d.

Golfe de Siam. Croquis du mouillage et des îles Bai-Ba-lung. Par Delamare. Paris, 1874. 10d.

Archipel de Soulou. Cagayan Soulou et îles adjacentes. Par Delamare. Paris, 1874. 10d.

Japon. Côte sud de Nipon. Croquis de bozen Iwa ou Banc Lady Inglis. Par P. Méa. Paris, 1874 7½d.

Japon. Mer intérieur (Sténo-no-utchi). Plan des canaux entre Odutsi et la pointe d'entrée de la baie d'Okayama. Par E. Dufour. Paris, 1874. 1s. 8d.

Japon. Mer interieure. Iles de l'Harima-Nada. Par Dufour. Paris, 1874. 1s. 8d.

Japon. Ile Saghalien. Rade de Kousounai. Par Delamare. Paris, 1874. 7½d.

Japon. Côte ouest de Saghalien. Rade Korsakovsk. Par E. Delamare. Paris, 1874. 5d.

Log Book.

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The Arctic Expedition.—In our last number we gave some account of the services of Captain Nares, Commander A. H. Markham, and Lieutenant Pelham Aldrich, who had been appointed to the Arctic Expedition. The following officers have since been selected to serve in this great enterprise:—Lieutenant Lewis A. Beaumont entered the service in 1862, and was promoted to the rank of lieutenant, out of the Royal Yacht, in 1867. He served on board the 'Blanche' on the Australian Station (of which vessel Commander Markham was First Lieutenant), from 1868 to 1871. He then qualified for Gunnery Lieutenant on board the 'Excellent,' was appointed as Instructor in the torpedo experiments, and was selected as Gunnery Lieutenant of the 'Lord Warden,' flag-ship in the Mediterranean, on September 4th, 1874. Lieutenant A. C. Parr entered the service, on board the 'Victoria,' under Captain Goodenough (flag of Sir Robert Smart), of which Commander Markham was a lieutenant, and served in the Mediterranean from 1864 to 1867. He was afterwards in the 'Pylades' and 'Hercules' (Captain Sherard Osborn), and in June 1874 was appointed Gunnery Lieutenant of the 'Monarch.' Lieutenant W. H. May also commenced his naval career in the 'Victoria,' from 1864 to 1867, and subsequently served in the 'Liffey' and 'Hercules.' He has since been studying at the Royal Naval College at Greenwich, and gives up a good prospect of a college fellowship, from zeal for Arctic service. Lieutenant Wyatt Rawson entered the navy in 1866, on board the 'Minotaur' (Captain Goodenough), and was afterwards in the 'Narcissus,' in the flying squadron. During the Ashanti war he was in the 'Active' (Commodore Hewett), and distinguished himself in the march to Kumasi with the naval brigade, when he was wounded. Lieutenant Reginald B. Fulford attained that rank on August 8th, 1874, and is now studying at the College at Greenwich. He is of the old Devonshire family of Fulfords of Fulford, one of the daughters of which, Mistress Faith Fulford, married John Davis of Sandrudge, the famous Arctic navigator and discoverer of Davis Straits. Lieutenant Robert H. Archer was in the 'Galatea' from 1867 to 1871, obtained his Lieutenant's commission in 1872, for having got full numbers at the examinations, and has since been serving in the 'Agincourt,' flag-ship of Admiral Hornby. Lieutenant G. A. Giffard obtained his present rank on August 28th, 1870. Sub-Lieu-

tenants G. Le C. Egerton and Crawford J. M. Conybeare have been appointed. Dr. Thomas Colan, M.D., lately in the receiving ship at Dundee, and Dr. Edward L. Moss, M.D., who has been, for two years, in charge of the Esquimalt Hospital at Vancouver's Island, are the medical officers of the Expedition.

Each ship will have an assistant-paymaster in charge, and two engineers. The officers of the former rank are Mr. Thomas Mitchell and Mr. Edgar Whiddon. The engineers are Messrs. James Melrose, James Wootton, John Pitt, and George White. A botanist, and a zoologist have been recommended to the Admiralty for appointments, by the Royal Society, but no official decision on this subject has yet been arrived at.

Six ice quarter-masters have been selected and entered for the expedition by Commander Markham, three belonging to Peterhead, and three to Dundee. The oldest and most experienced are John Thores and William Dougall, harpooneers, of Peterhead. Alexander Gray, of Peterhead, is a harpooneer of sixteen years' standing, and has passed five Arctic winters at Cumberland and Exeter Bays. David Deuchars, of Dundee, was a loose harpooneer in the 'Arctic,' in 1873, when he was a shipmate of Commander Markham. John Taws, of Dundee, is a harpooneer, and has passed one Arctic winter at Lievely, when the whaler 'Columbia' was lost. The name of the sixth man is James Berrie, of Dundee, who has served as a boat steerer.

The Arctic Manual.—It is very desirable that all existing information respecting Greenland, in every branch of science, should be brought together; in order that the explorers may be enabled to conduct their investigations with a full knowledge of all that has been done before, and with the means of comparing the scientific results, in the unknown area, with those on the known coasts of Greenland. Such information is now scattered in many separate volumes of Transactions of Societies, and in several languages. The Arctic Committee of the Royal Geographical Society have had under their consideration a proposal to prepare a *Manual for the Arctic Expedition*, containing such information, and the idea, at their suggestion, has also been taken up by the Committee of the Royal Society.

The greatest living authority on all scientific questions connected with Greenland is undoubtedly Dr. Robert Brown, M.A., F.R.G.S., without whose aid and advice it would not be possible to prepare a complete manual of the kind required. Dr. Brown is now on the Arctic Committee of the Royal Geographical Society, and will actively assist in the preparation of that portion of the manual which will be undertaken under its auspices. This will include the structural geography of Greenland, the physics of Arctic ice generally, and the condition of the ice at the various points along the threshold of the unknown region. Ethnological information will also be of great assistance in the event of the expedition falling in with inhabitants, or with vestiges of them, within the unknown area. A careful descriptive list of all vestiges of inhabitants that have hitherto been met with in the Parry Islands, and on the east and west sides of Greenland will be useful, together with descriptions of relics, lists of all native names of places with meanings, vocabularies, and a short grammar.

For the geology of Greenland there is no better account than Dr. Brown's "Geological Notes of the Noursoak Peninsula and Disco Island," in the *Transactions of the Geological Society of Glasgow*, which contains a full description of the fossil flora. It is to be hoped also that Dr. Hooker's valuable and suggestive paper on the "Outlines and Distribution of Arctic Plants," may be reprinted from the *Transactions of the Linnæan Society*, with a complete list of Greenland plants, and their ranges up to the latest date. Accurate descriptive lists should also be provided of the Greenland zoophytes, echinodermata, mollusca, fishes, birds, and mammalia, from various sources in England, Germany, or Denmark. The great value of a manual for the use of the Arctic Expedition, containing such information as has been sketched out, is well understood, and we are glad to be able to announce that a section has been undertaken by the Arctic Committee of the Geographical Society; while, at their suggestion, another portion will be edited by Mr. Rupert Jones, under the supervision of a Committee of the Royal Society.

The History of the Mission to Tibet in 1774.—Intercourse between Tibet and India must once, at the time when the tenets of Buddhism found their way from the valley of the Ganges to the frozen plains of Bod, have been frequent and unchecked. It has since been entirely destroyed by the policy of the Chinese Government, and the passes are now as closely watched as they ever were. At no time, since the English got a footing in the East, has this intercourse been so nearly restored as during the active and far-seeing rule of Warren Hastings. That great statesman, the only Governor-General whose memory has really found a permanent place in the minds of the people of India, sent two missions to Tibet, and none has ever reached that country since. That of Captain Turner is well known from the narrative published in a quarto volume in 1800. But the first and more important mission has, owing to the untimely death of the envoy, been lost sight of, and no account of it has ever been published. Searches have often been made, both in the India House and at Calcutta, for official reports relating to Mr. Bogle's mission to Tibet, but without success. It now turns out that all the manuscripts were, on Mr. Bogle's death at Rungpore in 1782, sent home to his family, and they have since remained in the possession of his representatives. Through the courtesy of the lady who is the actual possessor, these documents have lately been allowed to be examined, and made use of, and a history of this important Tibetan mission will now be published. The Bogle manuscripts, besides journals, reports, narratives, and despatches, consist of a large mass of private correspondence, including many inedited letters of Warren Hastings, Sir Elijah Impey, Sir Gilbert Elliott, Dr. Hamilton, and other eminent men.

The work, which is about to be published, will consist of a preface giving some account of the materials, an introduction containing a sketch of Himalayan and Tibetan geography, and an enumeration of all previous and subsequent journeys, and a short account of the life of Mr. George Bogle, the envoy to Tibet in 1774-75. The first chapter will include an account of the causes which led to the intercourse with Tibet, and the minutes and instructions of Warren Hastings. The second will be a narrative of Mr. Bogle's journey to

Tassisudon, the capital of Bhutan, and the five next will comprise an account of his residence there, of his conversations with the Deb Raja, a history of Bhutan, and the official despatches. Chapter viii. will contain a narrative of the journey from Tassisudon to Desheripgay, the residence of the Lama of Tibet, and the following chapters will include the negotiations with the Lama, reports on the trade and government of Tibet, an interesting account of Mr. Bogle's stay at Teshoo Lumboo, and a narrative of his return journey. The text will be illustrated by many additional notes from the private correspondence, and the work will be illustrated by a new map of Tibet, with all the latest discoveries, and of the mountainous region between Tibet and India.

Maintenance of Order in Peru. — The stability of the Peruvian Government under the presidency of Don Manuel Pardo, and the determination of the Peruvian people to terminate the period of recurring civil wars, have received a striking proof during the last two months. In former times when a general landed on the coast and proclained a revolution, there were simultaneously risings elsewhere, and the whole country was soon in a deplorable state of confusion. The attempt, under the adventurer Nicolas Pierola, in the end of 1874, has had a very different result. He indeed succeeded in landing on the coast from an English steamer, and in seizing upon Moquegua by surprise, but he was forced to retreat into the mountains almost immediately afterwards. His profligate attempt met with no sympathy.

Pierola entrenched himself, with the aid of General Segura and a few followers, on a height called Torata, and the fact of his retreat into the fastness showed that the days of successful adventures of this kind are numbered. Señor Pardo made prompt and very judicious military arrangements to nip the insurrection in the bud. Reaching Arequipa on December the 5th, with General Buendia, he at once took the supreme command, and marched through Moquegua to the village of Charsaques, at the foot of the range of Torata, occupied by the insurgents, who numbered about 1000 men. The President faced them with a force, under Colonel Riverola, consisting of two regiments of the line, one of the Lima national guard. a force first raised by Señor Pardo, and a small detachment of artillery, in all 1300 men. But another force had been sent into the interior to attack the rebel position in the rear, consisting of two regiments of the line under the gallant young sea captain Montero. Hastily collecting some national guards from Lampa and Puno, Montero led his division across the wild *puna* of the Andes, towards Torata. As soon as Montero's division was about due, the President, who had made his calculations with admirable precision, directed an attack against the front of the rebel position, covered by the artillery. After having been eight hours in action, the troops were ordered to return to their camp, having fully succeeded in the object of drawing off attention from the movements of Montero. No sooner had this been done, than Montero fell upon the rear of the insurgents, and completely routed them at a place called Besena Vista, on the Torata height. Pierola and Segura escaped, but the insurrection was entirely crushed and order has thus been maintained. In fact, no response was made to Pierola's call, and the result has shown that the people of Peru regard armed revolution with displeasure. The triumph of the civilian President is a further proof of the stability of his Government, and of the great advance in the appreciation of peaceful industry and progress which has been made by the Peruvian people of late years.

Colonel Gordon's Expedition.—Lieutenants Watson and Chippendale R.E., who left England to join Colonel Gordon, as surveyors, last summer, arrived at Gondokoro on November the 14th, 1874. They have now proceeded to explore lake Albert Nyanza in a small steamer built for the purpose, which had previously been conveyed to Duflé, a station above the falls that obstruct navigation between Gondokoro and the lake. M. Lenant, another member of the expedition, will proceed to and explore the Victoria Nyanza.

Correspondence.

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ARCTIC EXPLORATION AND THE DOGS OF GREENLAND.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Now that it is definitely settled that an expedition is soon to leave our shores for the further exploration of the Polar regions, those who are responsible for its equipment and provisioning will have an anxious time of it in providing everything that may not only prove likely to avert disaster, but that will also ensure, so far as mortal foresight will permit, the largest measure of success. Whatever the arrangements may be, we need have no fears as to their completeness and suitability to the end in view; but it struck me that the question of "sledging" is one which will require serious consideration, as ice-travelling may form an important feature in the task which our explorers will have set before them; and in connection with this mode of obtaining access to otherwise inaccessible regions, comes the provision of animals to draw the sledges. Doubtless, this can be accomplished by men, but the fatigue is very great, and the speed anything but satisfactory when the achievement of a journey within a comparatively brief period is of moment.

As is well known, the animals hitherto employed in these explorations have been dogs of the Esquimaux breed; and, in fact, these creatures are at present almost, if not the only beast of draught in Greenland. Several of our own Arctic explorers have employed them for their land and ice-journeys, and have commended them for their excellent qualities during these expeditions; while it is generally acknowledged that they are essential to the existence of the people in these latitudes, who rely upon them for transport; and several authorities, amongst others Wrangell, have indicated what a misfortune it would prove to these tribes did anything befall their canine slaves and companions—such as a contagious disease.

It would appear that the dogs of Greenland have been until lately exempted from many of the maladies which afflict their species in more favoured lands; at any rate, with one or two exceptions,* we have no record of their being visited by those wide-spread diseases which on many occasions have almost decimated the race of dogs in temperate regions; and we have been inclined to look upon the Esquimaux dog as the hardiest and healthiest of all breeds. Among other diseases affecting the canine species which had not been observed in the far

* Wrangell mentions a serious outbreak of the specific catarrhal fever commonly known as "distemper" among the sledge-dogs in 1821.

north was dog-madness or "rabies"—that terrible scourge which is not only transmissible from one dog to another by inoculation, but can be communicated to mankind and all other creatures through the saliva of the sick beast. My researches have shown that this dreadful disease has been witnessed in Sweden, Denmark, Norway, Northern Russia, and also in Lapland, and even in an epizoötic form, as in 1815 and 1824;* but there was no proof that it had ever been observed in Greenland and Kamschatka. The statement we have made to this effect was based on the reports of various travellers, and particularly of Erman, who, in describing the Ostyaks of Siberia and their dog-sledges, says: "Madness among the dogs would be, in this country, a most formidable scourge, and would infallibly cause the destruction of whole races of men; but everyone here (at Obdorsk) assured us that the disease is wholly unknown to them. Steller has stated the same thing respecting the dogs of Kamschatka; so that hydrophobia would seem to be one of the European results of living in towns. One essential and unfailing distinction between the dogs of Siberia and those of Europe, lies in the very moderate food of the former; whence it might be inferred that it is excess, and not want, which generates the morbid habit."†

My belief in the correctness of this statement has, however, been rather shaken within the last few years; and it is with the view of warning our own explorers, and those who are making arrangements for, and sketching out the plan of their operations, as well as suggesting the desirability of collecting information with regard to the existence and prevalence of this malady, that the present notes are thrown together.

Kane was the first to lead me to doubt the trustworthiness of the statement that rabies was unknown so far north; and though I was rather perplexed with his description, yet my doubts have been confirmed by the accounts of more recent travellers. The first intimation Kane gives us of any disease among his Greenland sledge-dogs is when frozen-up in latitude 70° 41′. On October the 5th, 1854, he writes:—"Yesterday, the mother of one batch (of puppies), a pair of fine white pups, showed peculiar symptoms . . . . . The animal was noticed this morning walking up and down the deck with a staggering gait, her head depressed, and her mouth foaming and tumid. Finally, she snapped at Petersen, and fell foaming and biting at his feet. He reluctantly pronounced it hydrophobia, and advised me to shoot her. The advice was well-timed; I had hardly cleared the deck before she snapped at Hans, the Esquimaux, and recommenced her walking trot. It was quite an anxious moment to me, for my Newfoundland dogs were around the housing, and the hatches were open. We shot her, of course."

Kane appears to have attributed the disorder to the absence of light during the sunless Arctic winter, as well as to the extreme cold; but he appears to have overlooked the fact that the Esquimaux dogs are accustomed to both, and that even imported dogs have resisted these influences without betraying any manifestations of such a peculiar malady. He writes, at a later period:—"The influence of this long, intense darkness was most depressing. Even our dogs, although the greater part of them were natives of the Arctic Circle, were unable to withstand it. Most of them died from an anomalous form of disease, to which, I am satisfied, the absence of light contributed as much as the extreme cold. January 25th.—The mouse-coloured dogs, the leaders of my Newfoundland team, have for the past fortnight been nursed like babies. No one can tell how anxiously I watch them. They are kept below, tended, fed, cleaned, caressed, and doctored, to the infinite discomfort of all hands. To-day I gave up the last hope of saving them. Their disease is as clearly mental as in the case of any human being. The material functions of the poor brutes go on without interruption; they eat voraciously, retain their strength, and sleep well. But all the indications beyond this go to prove that the original epilepsy, which was the first manifestation of brain disease among them, has been followed by a true lunacy. They barked frenzically at nothing, and walked in straight and curved lines with anxious and unwearying perseverance. They fawn on you, but without seeming to appreciate the notice you give them in return, pushing their heads against your person, or oscillating with a strange pantomime of fear. Their most intelligent actions seem automatic; sometimes they remain for hours in moody silence, and then start off howling as if pursued, and run up and down for hours. So it was with Flora, our 'wise dog.' She was seized with the endemic spasms, and after a few wild paroxysms lapsed into a lethargic condition, eating voraciously, but gaining no strength. This passing off, the same crazy wildness took possession of her, and she died of brain disease—arachnoidal effusion—in about six weeks. Generally, they perish with symptoms resembling locked-jaw in less than thirty-six hours after the first attack . . . . My dogs that I had counted on so largely, the nine splendid Newfoundlanders and thirty-five Esquimaux of six months before, had perished: there were only six survivors of the whole pack, and one of these was unfit for draught . . . . . Tiger, our last remaining dog, was seized with a fit ominously resembling the last winter's curse. In the delirium which followed his seizure, he ran into the water and drowned himself."* In a note it is added:—"Hydrophobia.—The caption at the head of the page is not intended to affirm the existence of the disease in this high north. Some of the tetanoid symptoms attendant upon tonic spasms closely simulated it; but the disease, properly speaking, is unknown there." And in another place, Kane mentions that of his dogs, "in spite of every effort, no less than fifty-seven perished, many of them with symptoms not unlike those of hydrophobia. The loss of these animals interfered seriously with my original scheme of research."

It will be seen from Kane's description that the mortality among his sledge-dogs was very great: indeed, they all perished. And it must be admitted that the symptoms enumerated by him, and particularly in the first case he mentions, bear a most striking resemblance to those noted in rabies; the duration of the disease, and its fatality, were also characteristic of the malady; while the pathological alterations in the brain, especially the effusion, are, as I have pointed out elsewhere, very frequently found in dog-madness. Kane had never seen rabies in the dog, and was therefore unacquainted with the symptoms of the disease, which he attributed, as I have already said, to the lengthened cold and darkness. But, as has just been stated, the Esquimaux dogs are accustomed to the severest degree of cold, and to the long Arctic night which continues for months; so that these could scarcely operate in producing such a fatal malady. Besides, other explorers previous to Kane had carried dogs even farther north, without witnessing this apparently anomalous disease in them. It was reserved for Hayes, who accompanied Kane in 1854, and who appears to have attentively observed this malady at that time, to make us better acquainted with it at a later period, and to prove that cold and darkness had nothing to do with its production and prevalence. In his *Open Polar Sea* we are made cognisant of the fact that it existed over nearly the whole of Greenland, where it had almost ruined the Esquimaux, by destroying their only means of transport.

On Hayes' arrival in Greenland in 1860, he discovered "that a disease which had prevailed among the teams during the past half-year, had diminished the stock to

* See my Works: *Animal Plagues* (London 1871), and *Rabies and Hydrophobia* (London 1872).

† *Travels in Siberia*, vol. ii., p. 34.

* *Arctic Explorations*, vol. i., pp. 106, 123, 156, 163, 459.

less than half of what was required for the prosperity of the people; and all our offers to purchase, either with money or provisions, were at first flatly refused, and were in the end only partially successful . . . . So great and universal had been the ravages of disease among the animals, that many hunters were wholly destitute, and none were in possession of their usual number."

In another portion of his interesting volume, he alludes to the outbreak in more detail. "I have mentioned that a disease had been for several years prevailing among the dogs of Southern Greenland, and that a large proportion of these useful animals had fallen victims to it. The cause of this disease had not been determined; but I was led to believe, from what information I could obtain, that it was purely of local origin, and that, therefore, when I had removed my teams from the seat of its influence I would be freed from its dangers. Under this impression, I had consumed much time at the Danish Esquimaux Settlements, in picking up here and there a dog, until I had obtained thirty-six animals. Up to the 1st of December they remained in perfect health; and being fed upon an abundance of fresh meat, I had great confidence that I should be able to carry them through to the spring, and when the period of my sledge explorations should arrive, that I would have four strong and serviceable teams. My fears were for a time somewhat excited by the information received from Hans, that the Esquimaux of Whale Sound and vicinity, with whom he had been living, were heavy losers by the death of a number of their dogs, and the description which he gave of this distemper corresponded with that of Southern Greenland; but November being passed without any symptom of the malady having made its appearance in my splendid pack, I felt hopeful that they would escape the visitation. The loss which Dr. Kane had suffered by the death of his teams was fresh in my recollection; but for this there appeared to be a sufficient cause. Being almost wholly without fresh food of any kind, he was compelled to subsist his teams upon salt meats, which, giving scurvy to his men, could hardly be expected to act otherwise than injuriously upon the dogs, which had always before been used to a fresh diet of seal meat.

"My hopeful anticipations were, however, not realised. One day, early in December, Jensen reported to me that one of the finest animals had been attacked with the disease, and recommended that it should be shot, to prevent the disease spreading; and this was accordingly done. A few hours afterwards, another one was seized in the same manner. The symptoms were at first those of great restlessness. The animal ran several times around the ship, first one way and then the other, with a vague uncertainty in its gait, and with an alternate raising and lowering of the head and tail, every movement indicative of great nervous excitement. After a while it started off towards the mouth of the harbour, barking all the time, and seeming to be in mortal dread of some imaginary object from which it was endeavouring to fly. In a little while it came back, still more excited than before. These symptoms rapidly increased in violence; the eyes became bloodshot, froth ran from the mouth, and the dog became possessed of an apparently uncontrollable desire to snap at everything which came in its way.

"The disease ran its course in a few hours. Weakness and prostration followed the excitement, and the poor animal staggered around the vessel, apparently unable to see its way, and finally fell over in a fit. After struggling for a little while in the snow, consciousness returned, and it got again upon its feet. Another fit followed soon afterwards; and then they came one after another in rapid succession, until finally its misery was relieved by death, which occurred in less than twenty-four hours from the incipience of the attack. Meanwhile I had watched it closely, hoping to discover some clue to the cause, and to establish a cure. But I could obtain no light whatever. Dissection revealed nothing. There was no apparent inflammation either of the brain, the nerve-centres, the spinal cord, or the nerves themselves; and I was wholly at a loss to understand the strange phenomenon. That it was not hydrophobia was shown by the fact, that the animal rather desired than shunned water.* Many of the symptoms attending that disease were, however, manifested; but it did not, like hydrophobia, appear to be communicated by the bite; for those dogs which happened to be bitten were not more speedily attacked than the others.†

"This case had scarcely reached its fatal termination before another was reported, and it was relieved of its misery by a bullet. Seven died during four days, and I saw with consternation my fine teams melting away, and my hopes endangered, and while this was in progress I could only look on and wonder and experiment, but could never stop the contagion nor arrest the evil."

Another case, which still more closely resembles rabies, is described as follows:—"Among the first dogs attacked was a superb one that I have before named. He was the best draught animal of my best team, the second leader—Karsuk. I have never seen such an expression of ferocity and mad strength exhibited by any living creature, as he manifested two hours after the first symptoms were observed. Thinking that confinement might do good, and desiring to see if the disease would not wear itself out, I had him caught, and put into a large box on the deck, but this seemed rather to aggravate than to soothe the violence of the symptoms. He tore the boards with indescribable fierceness, and, getting his teeth into a crack, ripped off splinter after splinter, until he had made a hole almost large enough for his head, when he was ordered to be shot. At the moment his eyes were like balls of fire; he had broken off one of his tusks, and his mouth was spouting blood. Soon afterwards another fine animal, which seemed to be perfectly well a few moments before, suddenly sprang up, dashed off with a wild yell, wheeled round the harbour, returned to the vessel, and there fell struggling in a fit. I had him tied, but he tore himself loose, and, fearful for the other dogs, he too was killed. Three others died the same day, and the deaths during the first two weeks of December were eighteen. This, with the losses before sustained, left me with only twelve animals. One week later these were reduced to nine."

Eventually nearly all the dogs had succumbed, and this misfortune indirectly caused the death of one of Hayes' colleagues—a most promising man of science.

In the French edition of Hayes' book, published in 1872 (*La Mere Libre de Pôle*, Hachette, Paris), the editor, Belin de Launay, states that the epizoöty continued up to that date, and that it prevailed from Smith's Straits to Jakobshavn.

The distress it caused in Greenland was very great, and Hayes, when speaking of an Esquimaux chief, tells us of the suffering this man and his people endured from the disease among the dogs. Indeed, it would seem that if the malady does not soon cease its ravages, the canine race will become exterminated in these inhospitable regions. And, if so, what will become of the Esquimaux? Their dogs are to them invaluable treasures, without which they have no security against want and starvation. Will they become extinct when their dogs have died? Or will they be able and willing to migrate to more genial latitudes, and change their mode of life altogether? Either Steller or Wrangell, I at this moment cannot remember which, tell us of a tribe in Northern Siberia, that from living inland as a pastoral people, had to wander to the sea-coast, and become a community of fishermen, in consequence of a deadly malady which destroyed all their reindeer.

* This is a grave error. Rabid dogs have no dread of water—rather the contrary. Hydrophobia, therefore, is an inappropriate designation.

† This is no argument for or against the disease being rabies.

Is this dog disease rabies? From the symptoms described by Kane and Hayes, there can be no doubt that if it is not that serious malady, it at least bears the closest resemblance to it. Hayes' teams were collected in districts where the scourge prevailed, and we need, therefore, be scarcely in doubt as to its contagiousness. The initial symptoms do not appear to have attracted attention, and it was only when the more violent indications appeared that the existence of the disease was noted. No measures appear to have been adopted by the Esquimaux to prevent its extension; and whether it still prevails, or ceased when it had no longer any victims, we cannot say. Immediately on Lieutenant Payer's arrival in England, I addressed him on the subject, and he courteously favoured me with the following reply:—"It has given me great pleasure to receive your query. The interest you take in so peculiar a subject as canine welfare, is only another proof of the eagerness with which practical information concerning those regions is sought in this country. With respect to the animals you mention, I have to inform you that I learnt nothing more than the account given by Kane and Hayes. From Greenland itself we had no dogs, nor did we come across any. The dogs we had were all procured in Vienna, and were Newfoundlands—they answered our purpose admirably. As to diseases, I can say nothing."

It will be perceived that Payer, by taking his sledge-dogs from Vienna, escaped the loss which befell Kane and Hayes; and it is now a matter for serious consideration whether our own exploring expedition should not obtain its canine quadrupeds from other regions than Greenland, should sledge-work be anticipated. To say nothing of the danger incurred from the presence of rabies among the dog-teams, the loss of the animals might prove a source of great embarrassment to the expedition at a critical moment, as it did in Kane and Hayes' explorations.

Whatever be determined upon, however, it is to be hoped that, if the opportunity offers, careful inquiries will be made by our expedition with regard to this malady among the Greenland dogs, as to its nature, the amount of damage it has caused, and whether it has been communicated to the human species. Comparative pathology, no less than geographical discovery, have a more or less pressing interest in a subject of this kind.—Yours, &c.,

GEORGE FLEMING.
Royal Engineers.

BROMPTON BARRACKS, CHATHAM,
January 6th, 1875.

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To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—To the critical observations of so eminent a veterinarian as Mr. Fleming, I can add nothing of any value. I will, therefore, best respond to your invitation to state what I know of the Greenland dog disease by simply giving the following extracts from my papers on the Greenland mammalia (*Proc. Zoological Society of London*, 1868, p. 348):—"When the Greenland dogs die off, the Greenlander must become extinct, more certainly even than must the 'Plain' Indian when the last buffalo is shot. It is impossible for him to drag home the seals, sharks, white whales, or narwhals, which he may have shot in the winter, at the 'strom-holes' in the ice, without his dogs; or for the wild native in the Far North to make his long migrations, with his family and household goods, from one hunting ground to another without these domestic animals of his. Yet that sad event seems to be not far distant. About fifteen years ago, a curious disease, the nature of which has puzzled veterinarians, appeared among the Arctic dogs, from high up in Smith's Sound, down the whole coast of Greenland to Jakobshavn (latitude 69° 13′ N.), where the icefjord stops it from going further south; and the Government uses every endeavour to stop its spread beyond that barrier, by preventing the native dogs, north and south, from commingling. Kane and Hayes lost most of their dogs through this disease; and at every settlement in Danish Greenland the natives are impoverished through the death of their teams. It is noticed that whenever a native loses his dogs he goes rapidly down hill in the sliding scale of Arctic respectability, becoming a sort of hanger-on of the fortunate possessor of a dog-team. During the latter portion of our stay in Jacobshavn, scarcely a day elapsed during which some of the dogs were not ordered to be killed, on account of their having caught this fatal epidemic. The dog is seized with madness, bites at other dogs, and even at human beings. It is soon unable to swallow its food, and constipation ensues. It howls loudly during the continuance of the disease, but generally dies in the course of a day, with its teeth firmly transfixing its tongue [tetanic convulsions]. It has thus something of the nature of hydrophobia, but differs from that disease in not being communicable by bite [to human beings], though otherwise contagious among dogs. The Government [of Denmark] sent out a veterinary surgeon to investigate the nature of the distemper; but he failed to suggest any remedy, and it is now being 'stamped out' by killing the dogs whenever seized—an heroic mode of treatment, which will only be successful when the last dog becomes extinct in Greenland. Strange to say, the dogs in Kamschatka are also being decimated by a very similar disease; and in a recent communication received from that region, it is said that so scarce have dogs become, that the natives do not care to sell them, and that 100 roubles have been refused for a team of six. Fortunately for the Kamschatkans, they have the reindeer as an ulterior beast of draught and burden." Since writing the above, I have made many inquiries in regard to this dog disease of Danish officers who had arrived from Greenland, but without adding much to my previous knowledge. The disease still prevails, but has not extended—when I last heard from Greenland—south of the Icefjord of Jakobshavn. So careful were the Danes when I was in the country to prevent the dogs from Jakobshavn commingling with those of Claushavn on the other side of the Fjord—for the disease is contagious, whether the dogs are bitten or not—that during the winter, when anyone wished to cross from Jakobshavn to Claushavn, and *vice versa*, the sledge did not go the whole way, but the traveller left it a little way from the shore, after which the dogs were driven home again. Some of our dogs from Claushavn which had accidentally got ashore at Jakobshavn, were killed by order of the Governor, in case they should reach Claushavn in the winter over the ice, and spread the contagion among the then untainted dogs of that settlement. If the Arctic Expedition is determined to take dogs, I think, therefore, that they should endeavour to obtain them from uncontaminated districts—such as Egedesminde, Christianshaab, or Claushavn.

In South Greenland the natives do not use the dog sledge. It will, however, be found very difficult to obtain dogs in Greenland. The natives with more prudence than they are usually credited with, refuse to sell them; nor do I believe that the Danish Government in the interest of the natives, will be found willing to allow them to part with animals so essential to their welfare or even existence. If it had been practicable the western shores of Davis Straits, where the disease has not yet reached, would most likely be found a locality where healthy strong dogs could be more easily purchased than on the Greenland shores.

ROBERT BROWN.

January 23rd, 1875.

Proceedings of Geographical Societies.

ROYAL GEOGRAPHICAL SOCIETY.

Meeting of January 11, 1875.

SIR RUTHERFORD ALCOCK, Vice-President, took the Chair at 8.30 P.M. A letter was read from Lieutenant-Colonel C. C. Long, Staff-officer in the Egyptian service, dated Gondokoro, 20th October, 1874, in which he gave an account of his journey to King Mtesa, on the shores of the Victoria Nyanza. He left Gondokoro on the 24th of April last, charged by Colonel Gordon with a friendly mission to Uganda, the kingdom of Mtesa, accompanied by two Egyptian soldiers, and two servants. After a journey of fifty-eight days he arrived at the richly-cultivated district of Uganda, which appeared to him like a forest of bananas. King Mtesa received him with great friendliness and pomp, and ordered thirty of his subjects to be decapitated in honour of the visit. Permission was given Colonel Long to descend Murchison Creek, and view Lake Victoria, the waters of which he sounded, and found a depth of from 25 to 35 feet. In clear weather the opposite shore was visible, and appeared to an unnautical eye from 12 to 15 miles distant. He had intended to pass from the lake *viâ* Ripon Falls to Urondogani, but the superstitious natives prevented him, and he was obliged to return to Mtesa. Colonel Long left for Urondogani on the 19th of July, where, after much suffering, he arrived, taking twenty days to do a three days' march, robbed of all his baggage and provisions, and deserted by his porters. Returning to Egyptian territory by water, he discovered, in latitude 1° 30' N., a large basin or lake, at least 20 to 25 miles wide. He found the Upper Nile, from Ripon Falls to Karuma Falls, a fine navigable stream, and large enough to float the 'Great Eastern.' Resuming his march northward, he arrived at Gondokoro on the 18th of October. When at Uganda he induced Mtesa to close the road to Zanzibar, and, in the interest of Egypt's monopoly of ivory, to send his ivory to Gondokoro. He finally reports that Colonel Gordon will soon have a steamer on the Albert Nyanza, and intended also to move one to the Upper Nile above Karuma.

A paper was read "On a Journey along the East Coast of Africa from Dar-el-Salam to Kilwa, in December 1873," by Captain F. Elton. A paper describing Captain Elton's journey in that region will be found in our number for August, 1874, p. 181, to which we would refer our readers.

Major ERSKINE then read a paper by his son, Mr. St. Vincent Erskine,

ON A JOURNEY TO UMZILA IN SOUTH AFRICA.

In the year 1868 Mr. St. Vincent Erskine explored the Limpopo River, from its junction with the Lipalule, or Elephant's River, to its mouth, which was found at the Inhampura of the maps, and not, as previously thought by many, the Sabia, near Inhambane. This expedition was a most extraordinary one, considering that the difficulties overcome by a mere youth had baffled the attempts of many experienced travellers, well equipped with goods, whilst Mr. Erskine had only a few beads, blankets, knives, and a little calico.

Having lost his original journal, together with his observations, in a flooded river, this paper has been written from memory, and from the notes of Mr. Dubois, who accompanied Erskine as interpreter, and who returned by sea with the ivory sent to the Natal Government by Umzila, and the heavy baggage. Such latitudes and longitudes as are given are partly from recollection, but mostly from his map, which he had on his person. Erskine tried to interest different friends in the exploration of the country between the Limpopo and the Zambezé, so as to make another expedition; but having failed to do so, had settled down at home in despair. In August 1870 a deputation or embassy from Umzila, King of the Gosa, who rules from King George's River, at Delagoa Bay, to the Zambezé, arrived at Natal, apologizing for the ill-treatment Erskine had met with from his people on the Limpopo, and begged that he or some other person might be sent to establish friendly relations with them for trade and labour, and particularly that a ship with goods should be sent into the Limpopo, when he would "load it down" with ivory. Erskine had never ceased to regard the blank in the map north of the Limpopo as his property, and jumped at the opportunity when offered a mission by Lieutenant-Governor Keate, supplying a great portion of the goods required himself, the cost of which was afterwards paid by the Government. He sailed in a schooner in June 1871, with Mr. Robert Dubois (who had come out of the terrible Limpopo Expedition with him before), as his interpreter, and one Natal "Induna," or head man; a Zulu, and a Zulu man as servant, who spoke English, and one of Umzila's men, who had remained behind from the embassy to accompany him. On his arrival at Lorenzo Marques or Delagoa Bay, which he describes very minutely as a miserable place, owing to misgovernment and want of energy on the part of the Government and the inhabitants, who are all half-castes, he found the Governor hostile to his expedition, because hostile to the Chief Umzila, with whom his Government had been recently at war, and he therefore refused him permission to go into the interior, although he had a passport from the Portuguese Consul in Natal, marked for the interior, and letters from the Natal Government stating the object of his visit. Erskine, however, was not to be stopped in this way. He landed the bulk of his goods under Mr. Dubois, at Lorenzo Marques, as they had paid duty, and arranged with him a rendezvous on the Limpopo, proceeding himself to Inhambanè, a Portuguese settlement higher up the coast, where the Governor, thanks to M. Laforte, a French gentleman all powerful there, allowed him to proceed into the interior. The Bay of Inhambanè is surrounded by a belt of cocoa-nut trees, which grow luxuriantly, and which, if properly utilized, would produce an immense return. On the 31st of July he started for the interior, and marched 6 miles to a kraal, where he was well entertained with his party.

Proceeding through a country principally of deciduous thornless trees, with occasional umkoshle, and a sort of gutta percha, and sleeping in the open, he found plenty of water always at the huts, proceeding apparently from the Inyantombè River. The country was so flat that he attempted to get an observation for variation of the compass by amplitude. It gave 210° W. The barometric readings were lost with his journals. On the 2nd of August he reached Umzila Border, at the Inyantombè River, an affluent of the Inyanbone, which he also crossed, flowing northerly in latitude 23° 55', where he saw a creeper, which he describes as the original of Jack's bean-stalk, and which not only covered the tops of the trees like an umbrella, but also several bushes, and it was further supported by poles, until it covered 5400 square feet. Another peculiar tree, called Umtoute, was found unaccompanied by any other forest tree. It was deciduous, and apparently belonged to the leguminous order.

This was the character of the bulk of the country from Inhambanè to the Limpopo. The elevations were mere undulations, and had evidently been formed on a sea-beach by the action of the water, sometimes of mere sand, and at others from arenaceous soil of a red and more fertile description. They are universally covered by deciduous thornless trees, with but little grass, and that of a poor sort. There is no undergrowth. Patches of vegetable ivory palm fill occasionally desiccated lagoons. Several interesting spots required further investigation, especially the mouth of the Inbabalie or

Lavera River, and the mountainous region between Umzila's kraal and the Zambezé, including the auriferous region of the Manchu River. The idea occurred that as the litmus dye is produced from a tree lichen (the *orchilla*), perhaps the moss-like lichen, so profuse, might be utilized, though it is not strong enough for cordage. The natives' huts are always miles away from water, showing the great insecurity of life and property, and their clearings are at intervals along many rivulets and streams. Having reached the confluence of the Shohozoli, a large river, with the Limpopo, the bellowing of the hippopotami was instantly heard. This must have been an interesting moment when, calling to mind the desperate circumstances under which he had last seen the Limpopo, alone, fever-stricken, and with only a small piece of brass-wire left, with which to make his way back for many hundreds of miles. The valley was densely peopled when he was there in 1868, but now the population was much increased. Next day he reached Manjobos—his old enemy, Manjobo, commander-in-chief at the Bigin. Erskine sent to say that "Maskin" had arrived for the second time, and would like to see him soon. He came that night, but did not see him till morning, and then said he knew nothing of him, his mission, or of Mr. Dubois and the goods. He admitted next day that he knew of the expedition, but said he had nothing to do with it, and if it were true that Umzila wanted to be friends with the white men, he did not. Leaving on the 15th of August, he found plenty of inhabitants on the Limpopo for some distance, when the population became thinner.

The following day he met Mr. Dubois and his goods. Mr. Dubois had had a terrible time of it from want of bearers, and the troublesome navigation in canoes of the King George's River for about 70 miles. It is only about 8 miles from the sea. Though shallow at the mouth, the river appears to be deep elsewhere; hippopotami abounded, and the country was so infested with bugs and rats, that he could not sleep at night. The main stream bursts through the Bomba Mountains, and rises near Leydenburg; its chief affluents are the Salibala, on the upper waters of which are the new gold fields, the Umgérania, and the Umlumase. The King George's River is not more than 100 yards wide. All these rivers rise near Leydenburg, at about an altitude of 6000 feet. It is one of the finest and healthiest countries in the world. The coast lands drained by them are fertile, but the climate is too unhealthy for European occupation; therefore, except for depôts for goods, or for sugar or tropical produce, they will never be valuable. A small steamer from Lorenzo Marques, well supported, would find ample employment here. They now started back to Monjobos, finding the Limpopo quite unnavigable, and on arrival there spent some time in putting together his double canvas canoe, and making enquiries about his route; and he then records, for the first time, that the whole country, from the Limpopo due north to the Zambezé, was one dense bush-covered plain. Fish of various kinds abound in the Limpopo; one kind, weighing from 5 to 20 pounds, was very beautiful; it has eight teeth above and ten below, on the *outside* of the mouth, with channels cut to receive them. They now started down the Limpopo in the double canoe, described in Baines' and Lord's books, which Erskine had made under Baines' personal advice and drawings. They found the river so shallow that, although their craft drew only a few inches, they frequently ran aground. On the fourth day they met with a sad mishap: when crossing a wide reach in a breeze, the boat took in water at the junction of the deck and canvas, and, not landing soon enough to bale out, she went down. Mr. Dubois jumped overboard with his gun, but was compelled to drop it. Erskine collected his instruments, and swam to the shore with them. They lost two valuable rifles, their boat, pots, &c. Erskine dived that day and the next until quite benumbed, and severely cut with coral-rock, but could not recover anything but the boat, which was uninjured. The Kafirs afterwards broke her in landing, so that it was not worth while to repair her; and her skeleton was left in a tree as a trophy. They now went down the river in a dug-out. They were three days going down to the sea from Manjobos, and the river was only navigable for about 60 miles. Here Erskine was attacked by fever, which had been hanging about him ever since his exposure in diving for his things.

Erskine describes most minutely the entrance to the Limpopo, with instructions to vessels entering it. There is a double bar, and the tortuous channels are always open. He had no boat with which to explore these channels; but thinks they must be from 4 to 5 fathoms deep, and the same inside for 60 miles. It is altogether a more navigable river than either the King George's or Mapoota rivers at Delagoa Bay. The latitude, as determined by Erskine from the natural horizon, in 1868, was 25° 15′ S.; but the mist from the surf doubtless affected the result. Captain Owen's determination was 25° 11′ 6″, a difference of 34 miles. On this occasion, the mean of several stellar and solar observations almost exactly agreed with that celebrated surveyor's determination, namely, latitude 25° 12′ S.; the longitude was 33° 45′ E., disagreeing with Captain Owen's chronometric observations by 14′ his being 33° 31′ E. The width at the mouth was 1314 fathoms at high tide.

He sums up the navigation and commerce of the Limpopo thus:—It is difficult of entry; has 60 miles of navigation, 25 of which are directly inland; and it flows through a fine alluvial valley 15 miles broad. Its productions are hides, horns, native furs, gums (including copal, he believes), ground nuts, vegetable ivory, orchilla lichen, mangrove poles, perhaps a little catter (which grows wild, and is used by the natives), honey, and beeswax. Its advantages of position are its proximity to Leydenburg, in the Transvaal country, where breadstuffs are grown, as well as wool, and which is also rich in minerals of all sorts; the distance to the new Gold Fields being 170 miles.

The disadvantages of the Limpopo are the fevers, which prevail there, and all along that coast beyond 27° of latitude, but which does not extend beyond the foot of the hills which run, more or less, near to the sea, and the vast plateaux of which are as healthy as Madeira.

Mr. Erskine describes the coast from Durban to St. Lucia Bay, or the Zulu country, as having a high ridge near the sea, backed by hills rising step by step, but from thence northward towards the Zambezé; the bush country is a sandy flat. As a rule this plain may be described as a mitigated desert. The great limestone plain of South Africa is hemmed in by mountains to the west, and it extends, by the accounts of travellers, as far as Abyssinia. The maps of this coast are entirely wrong, and many mythical mountains and streams ornamental, thus showing the necessity for an Admiralty survey of the coast. The country here is called the Dibin.

He now came to quite a different race, whose huts were of bark, and so filthy that he slept under a huge baobab-tree, which dwarfed men into mere ants. These people wore tails or stumps sticking out behind made of leather ornamented with brass. This is evidently the origin of Lord Monboddo's men with tails, which, indeed, have often been mentioned by travellers, and are constantly alluded to by the Zulu Kaffirs, as well as unicorns, which are now known most certainly not to exist in the Basutu country they were supposed to inhabit. Here he overtook Mr. Dubois (whom he had sent on, nearly dead with fever), and if he had not arrived with a supply of quinine he would have died.

In latitude 22° 16′ he came to the large river Gabulu, called by the Portuguese Gavura. Several mythical streams are laid down here on the maps, which are all, no doubt, the Gabulu, which runs parallel to the sea, and has been touched at by traders. It runs into a bay called Masomone, north of Bazaranta Island.

The natives here described some immense caves near,

which they were too harried and disheartened and sick to visit. They said the caves were insupportably hot, and required light to visit them, and that there was a stream and pools in them—latitude 21° 43′, longitude 34° 34′. Here also they had to go twenty-four hours without water, with a long march, and the thermometer at 188° in the shade.

Next day they overtook Messrs. Beningfield and Skillbeck, who were shooting elephants, and found them in good health, and enjoying themselves *greatly*. As they wanted rest, they stayed with them some days, till they left for home at the end of March. The mornings now became so cold that they had to sleep on blankets and wear coats.

They now reached the Labi, which was inhabited by the dominant Umgonis, who had fowls and other food, and who rob the poor Tongas of everything. The bed of the Labi was 1000 feet wide, but the stream (then the dry season) only 100 feet, and 4 feet deep. They came here upon a kind host, who gave them a sheep, and offered Erskine a tusk of ivory and his daughter to wife; both of which were politely declined. Here, for the first time, their coffee was ground between stones, wooden troughs, from want of stones, having been previously used.

He was much distressed here to see the state of the little slave children (waiting no doubt, to be sold to the dealers), which he describes thus:—"We saw three or four poor little Kafirs and a lot of dogs lying in the ashes—an indistinguishable mass of flesh, or rather *bones*. They give these poor slaves *no* food. If there are any pot scrapings they get them; if not, they have only such rats and birds as they can catch."

Here they crossed the Labi in latitude 21° 18′: it is quite unnavigable, though its bed is a mile broad. The country was well inhabited.

They now passed through a dense bush, and then came to a fine forest, beyond which lay the largest kraal of Umzila's. There they found, as Erskine had predicted, rain and fine crops. They crossed the affluents of the great Bosi River. The path here was 1500 feet above the sea, the view from the western slope being the finest he had seen.

Having arrived near to Umzila's kraal, they sent to announce their arrival, when he replied that they were to stop where they were. Having waited a fortnight, they sent to say that unless placed nearer to him they should return home, as they were being starved there. They were, at last, allowed to come to his kraal at the sources of the Umswelisi, and called Tsamatskama or Nodwengu; Tsamatskama being its ancient Tonga name, and the latter a Zulu name, imitated from the name of the kraal of Umpanda, King of the Zulus. They halted within 500 yards of the King's kraal on the 8th of April 1872, having started from Natal on the 25th of June 1871; all those months having been wasted chiefly by the ignorant opposition of the Portuguese Governor at Delagoa Bay, and the rest by the want of bearers, owing to the disobedience of the tribes supposed to be under Umzila. The latitude of Umzila's kraal is latitude 20° 23′ S.; longitude by dead reckoning, 32° 30′ E.; elevation, by barometer and boiling-point, 3200 feet above the sea.

Long weeks were now passed in idleness, as sport was not possible, on account of the grass which was high overhead, and the buffaloes formerly wounded being dangerous. To pass the time they made an excursion to the Tongo Mountains without guides, as they could get none; breaking their way through the tall grass, and then following buffalo paths. There Erskine found a splendid site for a township. They heard here some vague rumours of ruins, but the moment inquiries were made, the narrators "shut up," being aware that they were on forbidden ground. Erskine thinks there can be but little doubt that ancient Muhammadan ruins exist between this and the Gorongosi of the old Monomotana (or Children of the Mines) people.

To say that this piece of country is full of interest is but expressing a tame opinion of its geographical and geological features. This basin of mountains is the source of the great Bosi, one of the most interesting problems of geography. By its exploration, a knowledge would be obtained of vast regions of healthy country closely adjoining the Port of Sofala, and if taken on hand by Portugal and offered to emigrants on a liberal scale, it would immediately solve for ever the native difficulty in Southern Mozambique, and form a source of wealth and commercial activity such as she has not known since the days of those heroes who gained for her a grand colonial empire, of which the fragment alone remains to her now.

Erskine slept at the foot of the great Shinanimane Mountain, which rises from the plain 3200 feet in a sheer wall on the Elaone River, in latitude 19° 50′. This can be marked as his furthest point in 1872. He found his friend's cattle, the sea-cows, and had a fine shot at 20 yards at one, but did not bag any. He made Umzila's easily in four days from this magnificent and valuable country.

In returning they came to his old point of what he called the "meeting of the waters," that is, of the Lipalulé or Elephant's River and the Limpopo, and found the latitude to be 24° 8′, being 34 miles more to the south than his observation in 1868, the error in which he explains as having been caused by erroneous reading. The longitude he now changed also (in consequence of that of Leydenburg being changed) from 33° 42′ E. to 33° 2′.

On his return he unfortunately lost his journals. He had carried them the whole way on his person, but the rivers in Natal being up, and having to swim, some of them on horseback, he was persuaded to put them into a waggon, where they were lost. He had hardly rested and realised his loss, when he started again back to Umzila's *viâ* Sofala, this time on "his own hook," and amply supplied with goods by Messrs. Dunlop, Mees, and Co., of Rotterdam, which eminent and enterprising firm has been occupied for some years past in developing the trade on this coast regardless of expense. The journal of this fresh expedition, in which he had 40 hunters and 160 bearers starting from Sofala, promises to be of great interest, and, as he had proper instruments and more experience, will be very valuable. Since his return by sea from the last expedition, he has started again from the same region a fourth time, but finding trade brisk at Delagoa Bay has remained there for the present, sending out hunters to shoot ivory.

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FRENCH GEOGRAPHICAL SOCIETY.

THE second annual meeting of the Society, held during the year 1874, took place on the 16th of December, and notwithstanding the unfavourable weather a large number of members were present.

After the President, Admiral de la Roncière Le Noury, had opened the proceedings, and M. Delesse had read out the names of a few of the new members, the general secretary, M. Maunoir, read his *résumé** of the geographical events of the year. Before touching upon these, however, he announced that the library had been enriched by the accession of 400 volumes and 100 maps, during the year under review, which raised the total number of books and maps to upwards of 10,000, and

* A writer in the *Journal Official* remarks that these *résumés*, forming, as they do in each case, a complete index to all geographical events of the year, should be bound up together for reference. He also observes that complete sets of the *Bulletin* (which gives certain papers of interest in detail) are, unfortunately, extremely rare. His last suggestion appears a valuable one, *i.e.* that papers read at the meetings should be printed and circulated among members on the following day, at the latest.

nearly 5000 respectively. The finances were tolerably satisfactory, and the Society had voted a sum of 400*l.* towards the approaching Geographical Congress. It was a matter of regret, however, that more money could not be spared for assisting travellers, and subscriptions to this end are much needed.

M. MAUNOIR then referred to the hydrographical labours of the past year. M. Manen had surveyed the course of the Gironde; endeavours had been made to improve the harbours of Boulogne and Cette; while abroad Messrs. Hérand and Bouillet had examined the chief places along the coast of Tongkin, and M. Hanusse the port of Sebanilla in the Antilles. The Marine Department had published 109 charts, and the War Department had shown activity in determining the new meridian of France, between the Department of Allier and the Pyrenees, and in ascertaining the difference of longitude between Marseilles and Algiers. The large official map of France, on the scale of 1:80,000, or about one and a quarter mile to the inch, is nearly completed; two sheets pertaining to France, and five to Corsica alone remaining unpublished. A map of the French Alps, a coloured map of France on the scale of 1:320,000, and a new one in six sheets, are also in hand, while the same Department has been engaged on maps of the Rhine, Algeria, Mexico and Syria. Among private productions the relief maps of Mlle. Kleinhans, and an agricultural map of France by M. Delesse, deserve notice. Three societies were founded in 1874, not including the central commission of commercial geography, viz., the Geographical Society of Lyons, the Society of Commercial Geography at Bordeaux, and the French Alpine Club. The following French travellers had died during the year 1874:—Garnier, Dourdeaux, Dupéré and Joubert, Captains Fau and Moreau.

M. Maunoir then proceeded to enumerate the chief doings of importance during the past year, and among them announced that Captains Roudouri and Parizot, and Messrs. H. Duveyrier and La Chatelier, mining engineer, had undertaken a series of investigations in order to ascertain if it were possible to create an inland sea in Algeria. He also stated that Messrs. Guierre and Bellot proposed to represent France in the approaching English Arctic Expedition, M. Largeau would explore that portion of the Sahara first touched by M. Dourneaux, M. Savorgnan de Brazza, a naval officer, would endeavour to follow up the route of Messrs. Marche and De Compiègnè, and Dr. Harmand, the discoveries of the French Expedition up the Mekong, and of M. Dupuis in Tongkin, and the researches of M. Delaporte in and about the ruins of Angcor. By far the greater number, however, of the events touched upon by M. Maunoir have been duly chronicled in our columns, and therefore need no second notice. The meeting then broke up.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

THE Society held its monthly meeting on the 4th (16th) of December, M. P. Semenof, Vice-president, being in the chair. H.I.H. the Grand Duke Constantine Nicolaivitch was present, and the proceedings opened with the usual monthly report from the Secretary.

M. WILSON drew attention, amongst other objects presented to the Society, to a description of the Amu Daria country, several Oriental manuscripts, &c., the gift of Prince Riza-Kouli-Mirza, who, in the capacity of aide-de-camp, took part for a time in the recent expedition. He also announced that M. Glukhofsky had presented certain collections of herbs and insects, made by M. Ogorodnikof, who had been attached to the caravan recently despatched towards Afghanistan. The disturbed state of the latter country prevented the caravan from entering it, and all operations were confined to the northern frontiers of Persia. M. Glukhofsky also purposed to present a collection embracing ancient coins, Turkmen songs, a variety of seeds of several useful plants, and specimens of metals and minerals.

In November a detailed report reached the Society from M. Chekanofsky, on the Olenek expedition, in Northern Siberia (the previous history of which we have already noticed, see p. 215 of our August, 1874, number). The report is dated July the 2nd, from the confluence of the Olenek and Tomba (67° 18′ N. latitude). The travellers, Messrs. Chekanofsky and Muller, accompanied by a Cossack, fifteen men and 150 reindeer, started from Erbokhogon (61° 16′ N. latitude) at the beginning of March, and proceeded along the valley of the Lower Tunguska, but the depth of the snow and the severity of the cold, which reached as low as 45° Centigrade below zero, necessitated frequent halts. On the 12th of March the expedition arrived at the confluence of the Kopokit and Olenek Rivers, and ascending the course of the former, they reached the water-parting of the Lower Tunguska and the Vilni, whence, travelling in a north-westerly direction, they descended into the valley of the Vava, and crossed the massive and bluff mountain chain of Anaon. Here they hoped to come across some natives who would show them how to regain the Olenek River, but although traces of habitations existed, no inhabitants were met. Fortunately two of their Tungoose guides agreed to accompany them further north, and three days later, on the 27th of April, when in latitude 66° 26′ 30″ N., they came upon a large stream, which they presumed to be the Olenek. A boat was built, and an attempt made thus to travel down stream, but the melting of the snows had swollen the waters so that the party were glad to land again. An old Tungoose was then met who informed them that this was the Moniero, and not the Olenek River, and that the latter lay some distance to the north-east. Following his instructions they struck off in that direction, and on the 28th of June reached the Olenek at its confluence with the Tomba, in 66° 18′ N. latitude. M. Chekanofsky also furnished details regarding the geological and botanical collections and observations he had made, and the astronomical, magnetical, and meteorological observations of M. Muller.

The Secretary announced that the Russian Committee which had been formed to co-operate with the Paris Geographical Congress, had drawn up a programme of operations. They did not propose to go beyond the consideration of cartographical apparatus and works on geography, although the Paris body contemplated the discussion of ethnography, fisheries, minerals, &c., but these subjects the Russians considered had been sufficiently represented at the Moscow and Vienna Exhibitions.

An abstract of Major Wood's paper on the Lower Oxus was then read, and excited much attention. The gallant major pointed out that much more water is drained off than is needed for local requirements, and the balance is wasted, owing to the defective system of irrigation. To the same cause must be attributed the creation of shallows and sandbanks, which gradually accumulated to such a degree as to obstruct the river's westward course into the Caspian, and so forced it to seek another and a lower declivity into the Aral Sea.

M. WILSON read a memorandum on the populations of St. Petersburg and Berlin according to the Censuses of 1869 and 1867 respectively. From the figures of these it appeared that in the former city those dependent for their livelihood on the earnings of the head of the family, form about one-third of the population, and in the latter about one-half. The number of servants, on the other hand, is very nearly twice as great in St. Petersburg as it is in Berlin. The number of women and children employed in the first-named city is much greater than in the second, although, in Berlin, there is a larger proportion of young children employed.

After the election of several new members, the meeting broke up.

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